

Underwater Hockey :: Turtle Hospital :: UWPhoto Composition



GLOBAL EDITION
May 2011
Number 42

Caribbean
Grenada

Germany
Space Diving

France
River Rhône

Portfolio
**Betty
Busby**

Dominica
**False
Killer Whales**

Dominican Republic
Humpback Whales

ATLANTIC
Azores

COVER PHOTO BY NUNO SÁ

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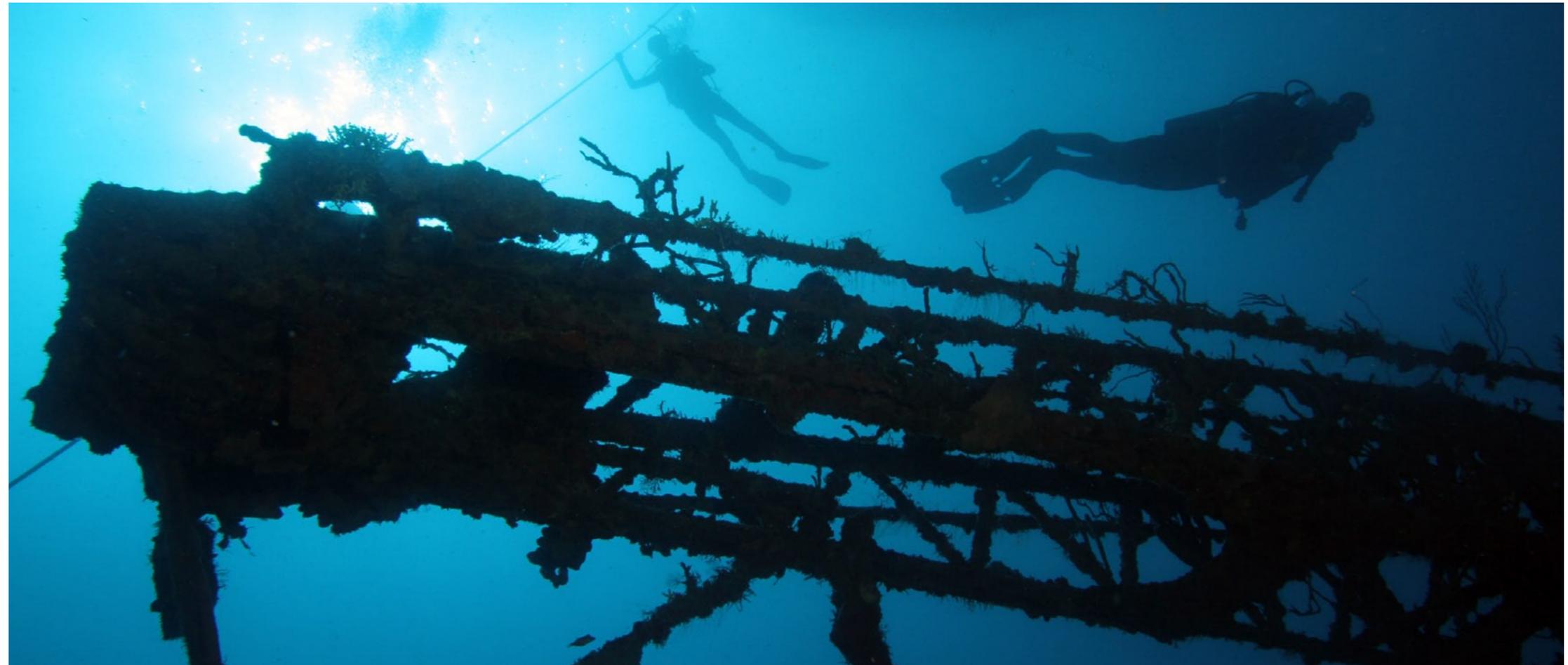
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COVER PHOTO: *Freediver with whaleshark, Azores,*
by Nuno Sá

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Divers at crane of *Shakem* wreck, Grenada. Photo by Kate Clark



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go quietly, amid the noise and haste...

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the rebreathers of choice from 6m to 160m

Image by Ray van Eeden of Prodivers, Kuredu, Maldives

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The Green Paradox — Diving Ecolabeled

Eco- or green-labelled products have become very popular lately in many countries. Either to steer consumers towards more healthy food, or services—and goods produced in an environmentally friendly manner. There is no shortage of well-intended “green labelling” programs to help save you or the planet you live on. What strikes me though is that this trend has not really reached the scuba diving industry.

Sure, there are operations which have gotten some kind of green label and try to offer products made in a sustainable manner. However, to have an impact on the environment or on yourself, any such measures have to include the vast majority of any industry. Let's face it. Scuba diving is a large global commercial industry, not created to save the planet but to make money for its entrepreneurs.

Parts of the scuba diving industry are certainly making their share of ocean-saving deeds. There are plenty of scientists providing solutions, implemented by the industry and divers asking for pristine reefs in hopes of saving the ocean.

This should not be restricted to the dive sites only. Any traveller should give some thought to the impact on environmental, socio-cultural and economic

values in the countries they visit. Many good initiatives are growing out of the demands from the industry's customers and reflections made by the industry itself.

On the other hand, the diving industry is working in many poor and underdeveloped countries where eco-labelling does not come in first, but feeding their children is of far greater and immediate importance. It is, however, too easy to tell poor local fishermen in third world countries, that their reef fishes have more value alive (to be seen by divers) than if they are fished for consumption. When divers, at the same time, fly around the planet to dive, leaving a dirty trail of carbon emissions behind.

Indulging yourself in a nice hotel with a chlorine-filled swimming-pool, imported foodstuffs and electricity supplied by a diesel generator or coal-plant; consuming loads of bottled water, tapped and hauled from a far away source; and last but not least, dive boats seldom are running on renewable energy make up the typical dive trip.

I do believe that most scuba divers have some kind of environmental consciousness. Not caring about the ocean you dive in would be like shooting yourself in the foot, or, for lack

of a better metaphor, peeing in your own tub.

Nevertheless, it is not always very easy to care. How can I travel, stay and dive eco-friendly? Should I finally find an eco-friendly way to dive travel? Are there any so-called green labels helping me in choosing the correct suppliers of services? How do I know it is not a bogus marketing scheme? However we work our way around these challenges, making people feel bad and using scare tactics is not the way to go. Making people proud of contributing to a better world is a more efficient path to pursue.

Would an eco-labelling program help the scuba diving industry comply with local and global environmental, socio-cultural and economic values? Is creating more bureaucracy going to improve the planet and the people living on it? I don't know, but let's at least give it a thorough thought and discuss it by studying what has already been tried out before we embrace or slaughter the idea.

The Ecolabel Index is the largest global directory of ecolabels, currently tracking 377 ecolabels in 211 countries, and 25 industry sectors. To my knowledge there are no ecolabels specifically targeting the scuba industry, although there are some that cater to the travel industry in general.

— Arnold Weisz
Associate Editor

Would an eco-labelling program help the scuba diving industry comply with local and global environmental, socio-cultural and economic values?



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—A Celebration of the Environment and Culture

Costa Rica has long been known not only as the most peaceful nation in Central America—it has no military—but as the most eco-friendly as well. As the second most sought after eco-destination after the Amazon, Costa Rica offers a rich and diverse environment ranging from rainforests and volcanic mountains to plains and powdery beaches.

Text by Richard H. Stewart

In Costa Rica, there is an abundance of wildlife—including 850 species of birds and 220 species of reptiles—and five percent of the world's biodiversity is here in this "rich coast". More amazingly, there are 12 different climate zones and close to 27 weather patterns.

In celebration of this environment and the culture of its people, EcoGroup Costa Rica has organized a week long event to be held 13-20 August 2011 called, EcoWeek Costa Rica—a nationwide event that has an assortment of activities throughout the various provinces.

Kicking off this ecotourism event is the Green Living Fair in San Jose, the capital of Costa Rica. Located at the Pedregal Events Center, the Green Living Fair is a gathering of national and international

businesses offering everything from green products, organic food, coffee and cocoa, to eco-resorts and adventure tours.

Other attractions at the fair will be the Children's Eco and Recycle Art Display, Medical Tourism presentations, a showcase of Wellness, Spa and Beauty facilities, as well as Green Communities featuring developers and home builders specializing in LEED certification construction.

San Jose will also host the country's first-ever State of the Oceans Summit—sponsored by the Ocean Realm Society and Rainforest Alliance—to explore the environmental initiatives in Costa Rica.

In the area of La Fortuna, home to the famous and active volcano, Arenal, there will be yoga and meditation, well-

ness and alternative medicines activities, as well as spa, hot springs and mud bath programs.

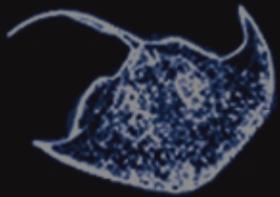
In the southern pacific town of Uvita, there will be ECOsta Rica Kids program, sponsored by the Rainforest Alliance and National Geographic Snorkeler, where the kids will learn about Costa Rica's amazing biodiversity, along with fun adventure activities like snorkeling, canopy tours and zip lining among others.

The Guanacaste area is world renown for its majestic Pacific Ocean vistas, a hundred miles of jagged cliffs that hug the rolling foothills meeting the rainforest. Guanacaste will be host to a variety of activities from the country's first-ever Green Golf Tournament, sponsored by Dixon Golf and Hacienda Pinilla; the first-ever EcoPhoto Challenge, sponsored by

EcoGuides and Dive Photo Guide, where the winner receives a nation-wide ecotour taking them from North to South and East to West, as well as having the winning photograph featured in EcoGuide Costa Rica and Dive Photo Guide; a Snorkel Treasure Hunt, sponsored by National Geographic Snorkeler; Canopy and Zip Line Tours and more!!

EcoWeek Costa Rica is the largest organized ecotourism event ever to be produced for the green traveler—a once in a life time opportunity to see and experience so much of Costa Rica's biodiversity and culture.

For more details, visit: www.EcoGuideCostaRica.com ■



X-ray mag

News edited
by Peter Symes
& Scott Bennett

NEWS *out of the deep*

An extension of the existing marine park around Cocos Island makes the marine park five times larger than it was previously, safeguarding a total of 9,946 km². Conservation International has been working with Costa Rica since 2005 to make this happen.

Text by Arnold Weisz

The creation of the park was formalized in an declaration by Costa Rican President Laura Chinchilla Miranda, March 3. The protected area called, Seamounts Marine Management Area (Area Marina de Manejo Montes Submarinos), is larger than Yellowstone National Park in the United States and second only to Galapagos National Park in terms of marine protected areas in the Eastern Tropical Pacific.

Helping species recovering

Recognized as a core site within Conservation International (CI) Eastern Tropical Pacific Seascape (ETPS) program since 2005, Conservation International worked with local partners for the past six years, to help make this decree a reality.

In that time, CI's local team supported Costa Rica in developing national shark and turtle strategies and the creation of new management categories including Marine Reserves and Responsible Fishing Areas, directly involving local communities in management.

Beacon of hope

A massive new marine protected area around Cocos Island is a beacon of hope for ocean health and human well-being in the Eastern Tropical Pacific, and will offer endangered marine species such as hammerhead sharks and leatherback turtles, as well as fish stocks that are important to local communities, the chance to recover from increasing pressures, CI said in their press-release in reac-

tion to the decree by the Costa Rican government.

Not completely off limit With the new boundaries of the marine park, the use of marine life will be controlled in a sustainable way within the sector adjacent to the 12 miles surrounding the island in order to protect this area, thereby avoiding depletion of the marine ecosystems. This will provide protection for ocean fish species, whales, marine turtles, mantas, sharks, tuna, Mahi-Mahi, as well as species that are threatened or in danger of extinction.

However, it doesn't mean that the area is totally off-limits for fishing activities. Fishermen in the surrounding Pacific area will be allowed to carry out medium and high volume fishing, sport



fishing, tourism, research and training as long as the protected area is respected. The Costa Rica Institute for Fishing and Agriculture (INCOPECA) was authorized to grant sport fishing and commercial licenses to extract fishing resources from the area based on the fisheries management plan within the overall management plan approved by the National System for Conservation Areas.

World Natural Heritage Site

The island was designated a national park in 1978 and has been home to resident park wardens since 1992. On 6 December 1997, the United Nations Educational, Scientific and Cultural Organization (UNESCO) declared Isla del Coco a World Natural Heritage Site.

Although the marine park has offered some protection to the marine life around

the island, the enlarged protected area will hopefully add some further protection, especially for two of the most endangered species that live in the waters around the island. The area is home to leatherback turtles listed as critically endangered on the IUCN Red List of Threatened Species. The Costa Rican sea turtle population has declined 90 percent in the past 20 years, due in part to the loss

of eggs to illegal harvest in nesting sites. Scalloped hammerhead sharks, also on the globally endangered species list, also live in the waters. They are targeted by fishermen for their fins.

Describing the decree as a day of national pride, Costa Rican Marine Program Coordinator for Conservation International, Marco Quesada said: "Creating a protected seamount area sets an

Costa Rica creates massive marine park

important precedent. Sea mounts host endemic species, and the deep water that upwells along their sides brings nutrients that support rich feeding grounds for sealife on the surface. Seamounts serve as stepping stones for long-distance, migratory species, including sharks, turtles, whales and tuna. So, we applaud the vision of the Costa Rican President, Laura Chinchilla Miranda, as well as the Minister and Vice Minister of Environment in making this historic move."

Divers' paradise

Cocos Island lies 342 miles (550km) off the coast of Costa Rica in the Pacific Ocean. The island has become very popular with divers over the last two decades, and served by several live-aboards.

Isla del Coco as it is called in Spanish, is the only major oceanic island of the eastern tropical Pacific with wet rainforest and, above 500m, a cloud forest. It also possesses the most diverse and extensive coral reef in the

east Pacific and rich surrounding waters with unusually large numbers of pelagic sharks.

Isla del Coco has been known to mariners and cartographers since the first half of the 16th century though its position was vaguely indicated and was only found by experienced sailors. The Government of Costa Rica took official possession of Isla del Coco in 1869. ■



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Prop-wash kills zooplankton

Turbulence generated by speeding motor boats kills significant numbers of zooplankton, new research has demonstrated.

Zooplankton play a crucial role in water ecology, and their deaths may have hitherto unknown impacts. Researchers stained the copepods using a dye, which colours live animals red, while dead ones remain unstained. The dye allowed them to quickly identify how many were alive and how many were dead in each sample.

"Regions with high boat traffic exhibited a higher occurrence of copepod carcasses," a PhD student at the Virginia

Institute of Marine Science in Gloucester Point, USA, told BBC News. Field sampling in the lower Chesapeake Bay showed that carcasses comprised 34 percent of the copepod population at a site with a high volume of boat traffic, whereas only 5.3–5.9 percent of the copepods were dead in the other two, less disturbed, nearby sites.

Direct sampling behind passing vessels showed that the percentage of copepod carcasses

increased from 7.7 percent outside the wakes to 14.3 percent inside the wakes. Laboratory experiments further showed that the fraction dead of the copepod population increased with increasing turbulence intensity, indicating that turbulence was causing mortality.

Zooplankton are a critical link between phytoplankton and fish in aquatic food webs. High mortality in copepods could reduce the ability of a zooplankton population to graze down phytoplankton blooms and reduce the amount of food available to smaller fish that eat zooplankton.

If copepod carcasses are not consumed by feeding fish they would be decomposed by bacteria within the water column.

Viewed at a global scale, the portion of zooplankton killed by boat-generated turbulence is probably minimal. However, turbulence could have a significant impact on zooplankton, and therefore water ecology, on a local scale. ■

SOURCE: BOAT-GENERATED TURBULENCE AS A POTENTIAL SOURCE OF MORTALITY AMONG COPEPODS, JOURNAL OF EXPERIMENTAL MARINE BIOLOGY AND ECOLOGY

Copepods are a group of small crustaceans found in the sea and nearly every freshwater habitat. Some species are planktonic (drifting in sea waters), some are benthic (living on the ocean floor). Planktonic copepods are important to global ecology and the carbon cycle. They are usually the dominant members of the zooplankton, and are major food organisms for small fish, whales, seabirds and other crustaceans such as krill in the ocean and in fresh water. Some scientists say they form the largest animal biomass on earth

Turbulence generated by boats can be an important source of mortality among copepods.



Zooplankton have a discerning sex life

Sexual selection is potentially important in marine zooplankton.

Scientists have discovered that zooplankton—tiny creatures that inhabit the ocean in their billions—actively choose their sexual partners. Despite being blind, the plankton try out and then reject the sexual advances of others, reserving their affections for bigger mates. That suggests sexual selection plays a key role in plankton evolution.

Pheromones

To overcome this, female copepods release pheromones to attract males, which try to actively swim to seek out mates. Considering their vast numbers, encounters between copepods may be relatively rare, and they have to get within a few millimetres to evaluate each other.

Despite these relatively rare mating opportunities, the creatures remain choosy about which other copepods they reproduce with, researchers at the National Institute of Aquatic Resources in Charlottenlund, Denmark, have discovered.

They studied mate preferences in the marine copepod, *Acartia tonsa*, and found that both males and females pass up mating opportunities, holding out till they come into contact with larger, and hence more attractive potential partners. ■

SOURCE: FIRST EVIDENCES OF SEXUAL SELECTION BY MATE CHOICE IN MARINE ZOOPLANKTON, OECOLOGIA, VOLUME 164, NUMBER 3, 627-635, DOI: 10.1007/S00442-010-1755-5

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“I am pleased to announce that all federal waters affected by the spill are now open to all fishing.”

—Jane Lubchenco, Ph.D., under secretary of commerce for oceans and atmosphere and NOAA Administrator

Gulf seafood safe to eat says NOAA

All federal waters of the Gulf once closed to fishing due to spill now open.

On 19 April 2011, the U.S. National Oceanic and Atmospheric Administration (NOAA) reopened to commercial and recreational fishing 1,041 square miles of Gulf of Mexico waters immediately surrounding the Deepwater Horizon wellhead, just east of Louisiana. This is the 12 and final reopening in federal waters since July 22 and opens all of the areas in federal waters formerly closed to fishing due to the Deepwater Horizon oil spill that occurred in April 2010.

This reopening was announced after consultation with the U.S. Food and Drug Administration (FDA).

Before waters were opened to fishing, NOAA and the FDA extensively tested seafood from those waters, and NOAA has now completed two additional rounds of sampling and testing from each of those reopened areas. Thousands of test results, all publicly available, prove Gulf seafood is safe from oil and dispersant contamination.

In June 2010, NOAA, the FDA and the U.S. Gulf states agreed upon an extensive sampling and testing procedure. Areas once closed to fishing were reopened only when all seafood sampled in the area passed both the established sensory and chemical testing for oil and dispersant.



The USFDA said a person could eat 63 pounds of peeled shrimp, five pounds of oyster meat or nine pounds of fish (18 eight-ounce filets) a day for five years without exceeding health risks

“Gulf seafood is consistently passing FDA’s safety tests by a wide margin,” said Eric Schwaab, assistant NOAA administrator in charge of NOAA’s Fisheries Service. “We are continuing to test, and we are making the data available to the public, so they can make fully informed purchasing decisions.”

“The system set up to keep tainted seafood out of circulation has worked,” said Don Kraemer, acting deputy director for FDA’s Center for Food Safety and

Applied Nutrition. “Consumers should know that Gulf seafood is extensively tested and is safe to eat.”

The unequivocal results of the rigorous methods used to insure Gulf seafood is safe—including smell tests and chemical analysis—are that any traces of oil in more than 40 species of marine life is 100 to 1,000 times below the level of concern, the level being set by a team of scientist from NOAA, the FDA, the Environmental Protection Agency (EPA) and all five Gulf states.

FDA’s Robert Dickey explained that in order to reach the level of concern as set by the team, a Gulf Coast resident would have to eat extremely large amounts of seafood and cited the Louisiana Department of Wildlife and Fisheries numbers set in conjunction with the FDA. ■

Not one piece of tainted seafood has entered the market related to the BP oil spill, starting within days of the well blow out.

— Eric Schwaab, assistant administrator of the National Oceanic and Atmospheric Administration fisheries

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The English Channel connects the Atlantic Ocean through the Strait of Dover with the North Sea. It is about 563 kilometer (350 miles) long and varies in width from 248 kilometer (154 miles) at its widest, to only 34 kilometer (21 miles). ■

Achim Schlöffel to dive across the English Channel

Achim Schloeffel, internationally renowned dive instructor for technical diving, is planning a spectacular world record in diving.

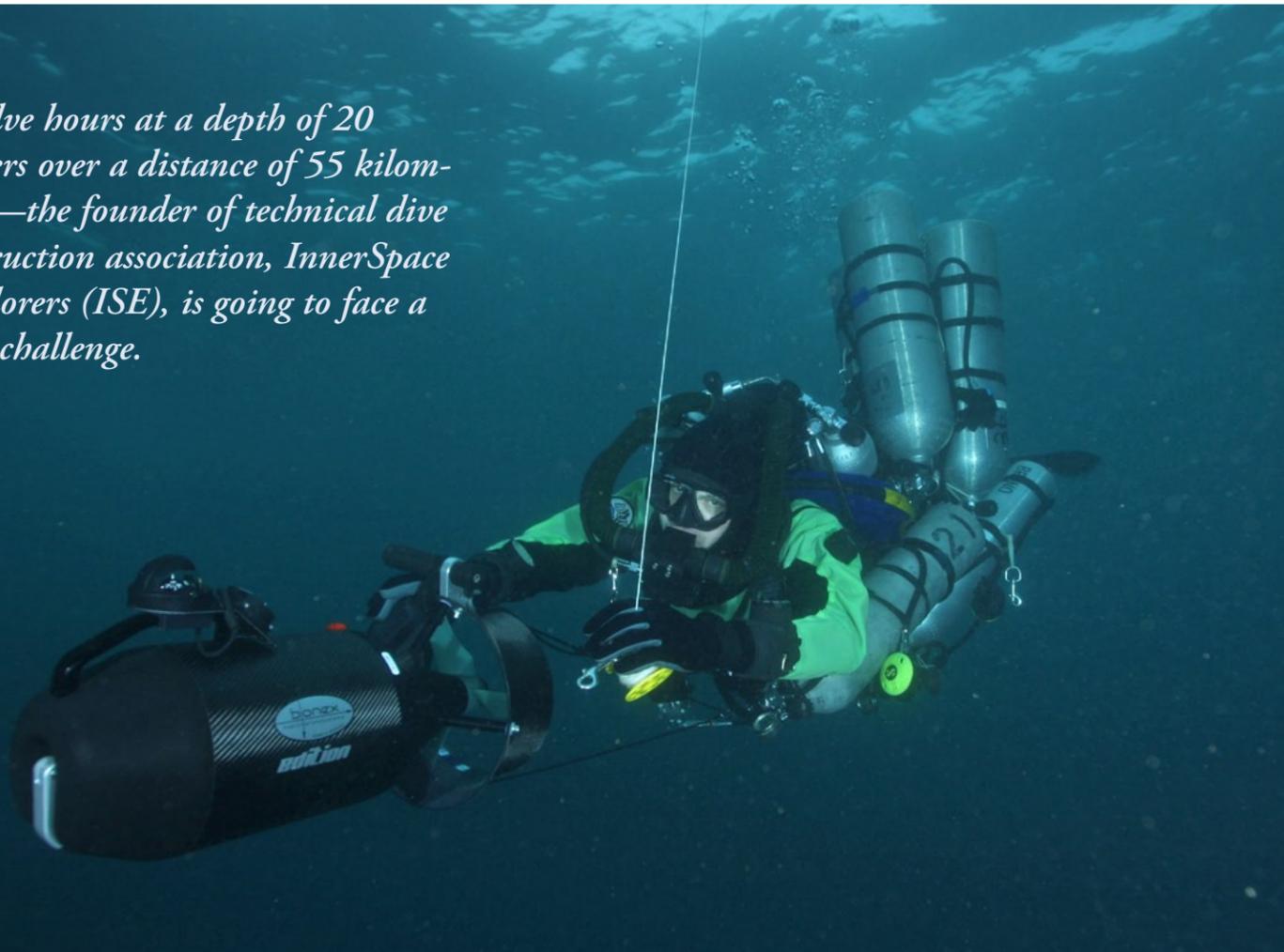
In August 1875, the Englishman Matthew Webb became the first person to swim across

the English Channel. Ever since, it has been repeatedly a site for spectacular attempts

to cross it. So far, all attempts to dive through the Channel have been in vain, the last effort

took place in 2005. In August 2011, Achim Schloeffel wants to prove that the techni-

Twelve hours at a depth of 20 meters over a distance of 55 kilometer—the founder of technical dive instruction association, InnerSpace Explorers (ISE), is going to face a real challenge.



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cal means in diving are now mature enough to cross the Channel, under water in one single dive without surfacing, from Dover to Calais.

The German-born diver, who has dived since the age of seven and has completed more than 7,000 dives to some extent in most difficult environmental conditions, will rely on innovative, technical gear for the dive. The scooter that will pull the diver over the long distance is an advanced development of the model by Bonex Exploration Systems. A first prototype will be tested in April.

The project will also receive large participation on the part of dive computer manufacturers. The medical and technical dates of the dive will be integrated into new software for the calculation of decompression models for technical diving.

Last but not least, during

the planning and preparation for the dive, physical and mental

aspects will be taken into account as well. Besides test dives, focus will be placed on daily running exercise as well as biking and swimming several times per week. ■



Edited
by Arnold Weisz

Virgin Oceanic plans to dive to 36,000 feet

Sir Richard Branson's, Virgin Oceanic, has built a one-man sub and is planning dives into the 36,000-foot-deep Mariana Trench and the 28,200-foot-deep Puerto Rico Trench. This will only be the second manned dive in history into the deepest place on the planet.

Virgin and Sir Richard Branson have made their fame in the air and outer space. This time, however, they will venture into the inner space. Unlike his

suborbital-space-flight company, Virgin Galactic, the new subsea venture is not accepting paying passengers. During 2011 and 2012, Virgin Oceanic's one-

person sub is planned to make dives to the deepest part of each of Earth's five oceans. The first dive will be to the deepest place on the planet: the bottom of the Mariana Trench—11 kilometers (7 miles) straight down.

Deepest on the planet

This will be the first time since 1960 that human eyes have set sight here—when the U.S. Navy bathyscaphe, *Trieste*, (which moved straight up and down like a hot air balloon) briefly touched down carrying co-pilots, Don Walsh and Jacques Piccard.

The Mariana Trench is located in the western Pacific Ocean, to the east of the Mariana Islands. The trench is about 2,550 kilometres (1,580 miles) long but has a mean width of only 69 kilometres (43 miles).

Virgin Oceanic's dive will be the fourth into the trench, as only three descents have ever been achieved. The first was the manned descent by *Trieste* in 1960. This was followed by the unmanned ROVs, *Kaikō* in 1996 and *Nereus* in 2009. This time, a sub that flies more like an airplane will allow the solo pilot, Chris Welsh, not only to reach the deepest point on Earth, but then to "fly" along the bottom of the trench an additional ten kilometers (nearly six miles).

The second dive planned by Virgin Oceanic—to the bottom of the Puerto Rico Trench—will be piloted by Sir Richard Branson. This trench is the deepest spot in the Atlantic Ocean at over eight kilometers (more than five miles). This location is also near to Branson's home on Necker Island in the British Virgin Islands.

Subsequent dives will carry a human pilot to the bottom of the Arctic, Southern and Indian oceans. Less than three percent of the seafloor has been explored, and none of the deepest points of the planet have ever been explored beyond a brief visit to one. The opportunities to see and learn from these dives are monumental.

Carbon fibre sub

The submarine was originally commissioned by Sir Richard's close friend and fellow adventurer, Steve Fossett, who had intended to complete the first solo dive to the depths of the Mariana Trench. Sir Richard intends to finish what his friend started.

The vehicle is a unique design made from 8,000 pounds (3.6 metric tonnes) of carbon fibre and titanium. The pressure at the bottom of the deepest trench is over 1,000 atmospheres—the quartz dome alone is under 13 million pounds (5.9 metric tonnes) of pressure, the weight of three space shuttles.

Designed by Graham Hawkes, it is the only piloted craft in existence that has "full ocean depth" capability. The one-person sub has an operating depth of 37,000 feet (7 miles) and is capable of operating for 24 hours unaided.

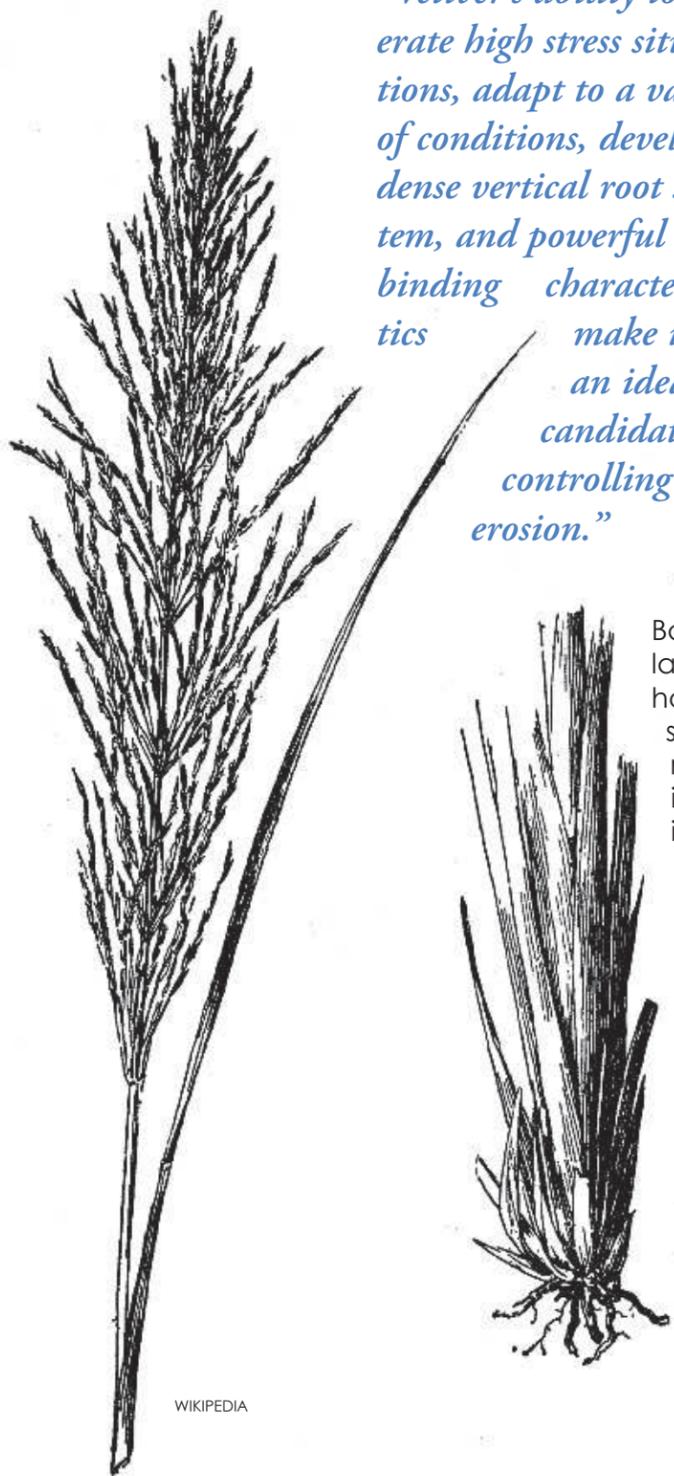
Once fully descended, the submarine's hydroplanes (the equivalent of airplane wings for submarines) and thrusters will allow it to "fly" up to 10km over the ocean floor whilst collecting video and data, something submersibles could only dream of. ■



Illustration of Virgin Oceanic's one-person sub

Grasses can protect reefs

“Vetiver’s ability to tolerate high stress situations, adapt to a variety of conditions, develop a dense vertical root system, and powerful soil binding characteristics make it an ideal candidate for controlling soil erosion.”



WIKIPEDIA

One of the major threats facing Guam’s reefs is soil erosion resulting in sedimentation and suffocation of the complex organisms that make up a reef system. But according to a report from the University of Guam, soil science professor Mohammad Golabi’s research shows that using vetiver grass to shield reefs in Guam’s Pago Bay helps protect them from the effects of construction-induced run-off.

In this pilot project, professor Golabi, in cooperation with the developers planted vetiver grass along a Pago

Bay beach area adjacent to a tract of land that had been cleared for a new housing project. Fully developed vetiver seedlings were planted in contour rows along the beach without disturbing the aesthetics of the area.

The plants established in a few months, forming a thick hedge that prevents sediment from water-borne erosion from flowing into the ocean.



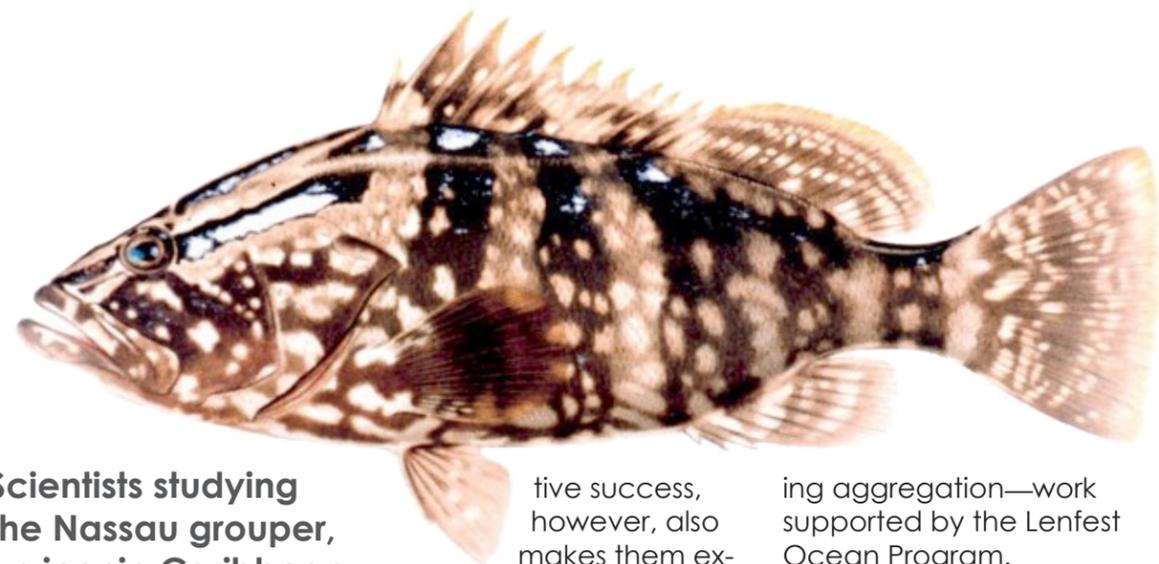
Once established, the plants can live up to 50 years and do not require maintenance other than periodic trimming. Under the proper conditions, thick hedges can be formed within one year of planting, although the report points out that, “it generally takes two to three growing seasons to establish a hedge dense enough to withstand torrential rains and protect the shoreline from sedimentation.”

“It is also expected that these vetiver hedges may even be able to protect the beach area against tidal surge once their root systems are well established. These hedgerows clearly demonstrate that the vetiver grass system is a unique, economical and effective bioengineering technology for protecting coral reefs from further degradation in the Pago Bay area and may be applied to other sites around the island,” Golabi said in a press release. ■



A University of Guam scientist uses vetiver grass to save reefs

Efforts to save threatened Nassau grouper is paying off



Scientists studying the Nassau grouper, an iconic Caribbean reef fish decimated by over-fishing, say it is showing tentative signs of recovery off the Cayman Islands since the government there imposed protective restrictions eight years ago.

However, their research also shows that the groupers’ behavior during spawning—and subsequent dispersal of their larvae—may threaten the long-term viability of the species without further protection.

“Nassau groupers form large aggregations to spawn,” said Scott Heppell, a fisheries ecologist at Oregon State University. “They are very predictable. The same trait that promotes their reproduc-

tion has been a key to their reproductive success, however, also makes them extremely vulnerable to fishing. And once their populations diminish, it is hard to rebuild them.”

Heppell and his colleagues are working with the Reef Environmental Education Foundation (REEF) and the Cayman Islands Department of Environment on a project to learn more about the Nassau grouper. They are particularly interested in how far the larvae disperse with the currents after spawning—a key factor in Caribbean nations’ efforts to rebuild depleted stocks.

As part of REEF’s “Grouper Moon Project”, the researchers deployed short-term and long-term drifter buoys to see where the currents potentially could carry the larvae. They also tagged several adult fish and set up telemetry sites to track the adults en route to their spawn-

ing aggregation—work supported by the Lenfest Ocean Program.

What they’ve found is that the groupers aggregate during the first full moon after the winter solstice. As many as 4,000 fish will gather at a site west of Little Cayman Island, then spawn some three to eight days later. The timing of their spawning appears driven by currents, said Heppell, an assistant professor in OSU’s Department of Fisheries and Wildlife.

“We wondered why the fish waited to spawn after aggregating,” Heppell said, “and the buoys appear to have provided the answer. As soon as the currents died down and eddies formed, spawning began. This has the effect of limiting short-term dispersal of larvae and keeps resident fish close to home.” ■

SOURCE: OREGON STATE UNIVERSITY PRESS RELEASE

Earth has 657 more barrier islands than previously thought



Using satellite imagery, researchers detected 657 more barrier islands than previous surveys indicated, bringing the new total to 2,149.

Barrier islands often form as chains

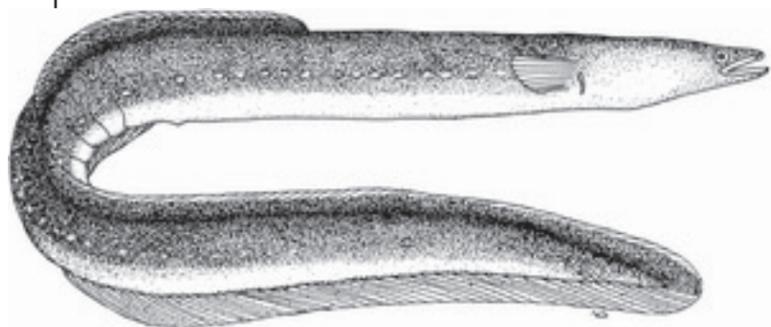
Barrier islands help protect low-lying mainland coasts against erosion and storm damage, and can be important wildlife habitats. A survey conducted in 2001 without the aid of publicly available satellite imagery identified 1,492 islands. But a recent study has found that the number of barrier islands around the world has been greatly underestimated.

of long, low, narrow offshore deposits of sand and sediment, running parallel to a coast but separated from it by bays, estuaries or lagoons. Unlike stationary landforms, barrier islands build up, erode, migrate and rebuild over time in response to waves, tides, currents and other physical processes in the open ocean environment.

The 657 newly identified barrier islands didn't miraculously appear in the last decade, explains Matthew L. Stutz, assistant professor of geosciences at Meredith, located in Raleigh, North Carolina, USA. They've long existed but were overlooked or misclassified in past surveys. Previously, for instance, scientists believed barrier islands couldn't exist in locations with seasonal tides of more than four meters.

Barrier islands are important for humans and environments, providing protection against flooding, erosion and storms. The bays, estuaries and lagoons created by the islands contain abundant biodiversity. Because of their proximity to waves and tides, barrier islands are one of the most flexible landforms, regularly eroding, migrating and rebuilding over time. Unfortunately, they are often the site of coastal development, which can be detrimental to these ecosystems. ■

Japanese eel mystery solved



A research team has found eggs of natural Japanese eels off the Mariana Islands in the Pacific Ocean for the first time, providing answers to long-time mysteries of where and when the fish spawn, it said in the British science magazine *Nature Communications*. Using a net for plankton, the team found the eggs estimated to have been fertilized about 30 hours before in a 10km² area south of the oceanic ridge.

Most eels used for food are raised in farms using fry caught at sea. The team hopes the discovery will lead to eel farming from eggs and prevent further declines in the eel population. ■



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10,000 year old artifacts found in Florida



Screenshot from ABC Actionnews news video

At Little Salt Spring in North Port, divers are finding artifacts that are giving us clues to how people lived ten thousand years ago. The underwater archeological and ecological preserve at Little Salt Spring in North Port is located in

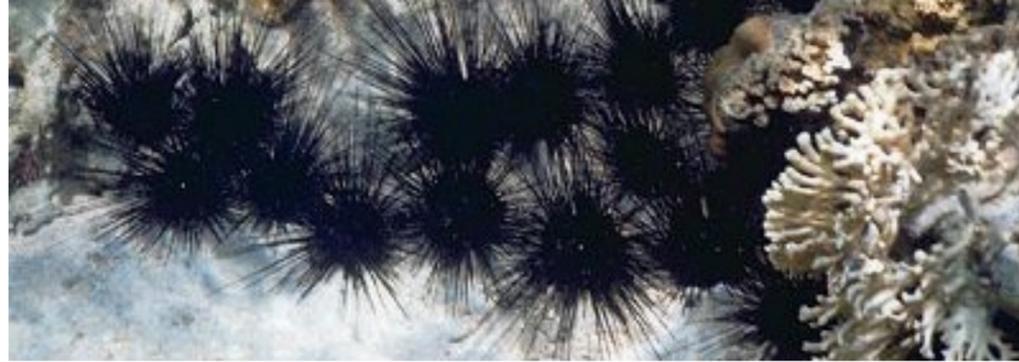
southern Sarasota County, Florida, USA, about ten miles (16 km) from the Gulf of Mexico. During early pre-historic times (12,000–7,000 years ago) the sinkhole was an oasis in the peninsula that attracted seasonal hunters and gatherers. The site has produced the second-oldest dated artifact ever found in the southeast United States—a sharp-

ened wooden stake some 12,000 years old. Little Salt Spring contains some of the oldest cultural remains in the United States.

The unique anoxic water that fills most of the sinkhole (below a depth of five meters or 16 feet) has preserved a great range of organic materials including wood, textile fragments, hair, skin and brain tissue dating back to the Late Paleoindian and Early Archaic stages of Florida's prehistory, ca. 9,500–7,000 radiocarbon years ago. Archaeological remains exist both in the spring basin and the "27 meters/90 feet ledge", a natural cavern at that depth below the spring surface. ■

SOURCE: THE ROSENSTIEL SCHOOL'S DIVISION OF MARINE AFFAIRS

SOURCE: THE ROSENSTIEL SCHOOL'S DIVISION OF MARINE AFFAIRS



Sea urchins see with their whole body

Study reveals the spiny invertebrates utilize their feet as retinas.

According to a study that appeared in the *Journal Proceedings of the National Academy of Sciences*, new research has indicated that sea urchins may use the entire surfaces of their bodies—from the ends of their “feet” to the tips of their spines—as huge eyes.

How do they see?

Scientists have long known that marine invertebrates react to light without any obvious eye-like structures, raising the question of how the animals see. Previous genetic analysis of the California purple sea urchin revealed that the animals possess a large number of genes linked with the development of the retina—the light-sensitive tissue lining the

inner eyeball in people and other vertebrates.

In conjunction with other research, it is now theorized that sea urchin vision may rely on light-receptor cells randomly scattered across their skin, which collectively function like retinas. Scientists had suspected the animals' spines simulate the light-blocking pigmented cells found in most animals' eyes. As light-receptor cells in the retina soak up light from every direction, pigmented cells work to block light from the back and the sides so animals can “see” what's in front of them.

Eyes in their feet

It has now been discovered that two distinct groups of bristly, light-

receptor cells are concentrated at the bases and tips of the purple sea urchin's 1,400-plus tube feet. Situated on the undersides of sea urchin bodies, the long, suction-tipped tubes help the organisms move.

Sea urchins use their tube feet as retinas and the rest of their bodies to shield against the extra incoming light, said researcher Maria Ina Arnone, a developmental biologist at Anton Dohrn Zoological Station in Naples, Italy. Previous studies discovered the number and placement of spines could affect the sharpness of its vision, and this new find “might well be part of the picture,” Arnone added. ■

Pollution forms an invisible barrier for marine life



Researchers at UH Mānoa's Hawaii Institute of Marine Biology (HIMB) examined the genetic structure of a common, non-harvested sea star, the bat star, to test whether the largest sewage discharge and urban runoff sources were affecting the genetic structure of this species.

They found that these large pollution sources are not only increasing genetic differentiation between populations (presumably by limiting the dispersal of larvae between them) but also decreasing the genetic diversity of populations closest to them. ■

Despite the known toxicity of terrestrial discharge, no one had investigated if it is limiting dispersal of marine larvae between populations along urban coastal areas.

Pollution alters genetics of bat stars



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Underwater hockey, anyone? Team members at the Coast Guard Academy in New London, Connecticut, USA, enjoy a very physical game under the waves

New rebreather association established

The Rebreather Education and Safety Association (RESA) recently held its first public meeting. Bruce Partridge of Shearwater Research confirmed that RESA was formed by the following manufacturers: Ambient Pressure Diving, Innerspace Systems, Jetsam, Oceanic, Poseidon, rEvo, Shearwater Research and VR Technology. In addition, a USA-based non-profit corporation was created with the following officers: Kim Mikusch-Smith (Jetsam) as President; Paul Raymaekers (reVo) as Vice President; Jerry Whatley (Innerspace Systems) as Treasurer; and Bruce Partridge (Shearwater Research) as Secretary.

Kim Mikusch-Smith stated, "We're really pleased that we have got to this point of

RESA being incorporated. We've been working for well over a year to get to this point, and we are excited because manufacturers for the first time in our industry are working together to really promote the education and safety of our divers. We want our industry to grow, we want it to be safe, and we feel that this is a great way to move forward."

Paul Raymaekers added, "We are also very happy that in the RESA organisation there is an equal distribution between North American and European Countries. There are four from each continent. The RESA organisation will contain three types of members. We have the regular members who consist of the manufacturers and

suppliers. We have associate members who will be and can be regular members in the future, and we have supportive members."

Finally, Jerry Whatley confirmed, "a few of the initial tasks that RESA completed after forming a non-profit corporation was to develop a set of bylaws that define the standards for membership and the operating perimeters for the organisation. This has been completed and agreed to unanimously by the current members as well as a budget. The budget was predicated on the minimum operating expenses for the organisation over the next few years and will be financed by initiation fees for the joining members and annual dues." ■

Cadet forms Coast Guard Academy's first underwater hockey team

Text and photos by Petty Officer 1st Class NyxoLyno Cangemi

Players push and shove their way to the puck, all clamoring for control. A slap shot sends the puck hurling through the crowded mess of players and into the goal. Point.

Exhausted, the players swim to the surface for a gasp of air.

In the game of underwater hockey, the battle for the puck is merely the beginning.

While playing the sport presents its own unique challenges, starting an underwater hockey team at the U.S. Coast Guard Academy proved to be just as challenging for one cadet.

The Academy

The Coast Guard Academy in New London, Connecticut, USA, is the training ground for the future leaders of the service. One of the often overlooked leadership opportunities offered at the academy is in the formation of club sports.

Any cadet at the academy can start a club sport, so when Coast Guard Third Class Cadet Collin Sykes, a native of Sandwich, Massachusetts, arrived at the academy in 2009, he saw an opportunity to introduce underwater hockey to a new group of individuals—his fellow cadets.

Collin was introduced to the sport of underwater hockey when he was three years old by his father Robb Sykes, who

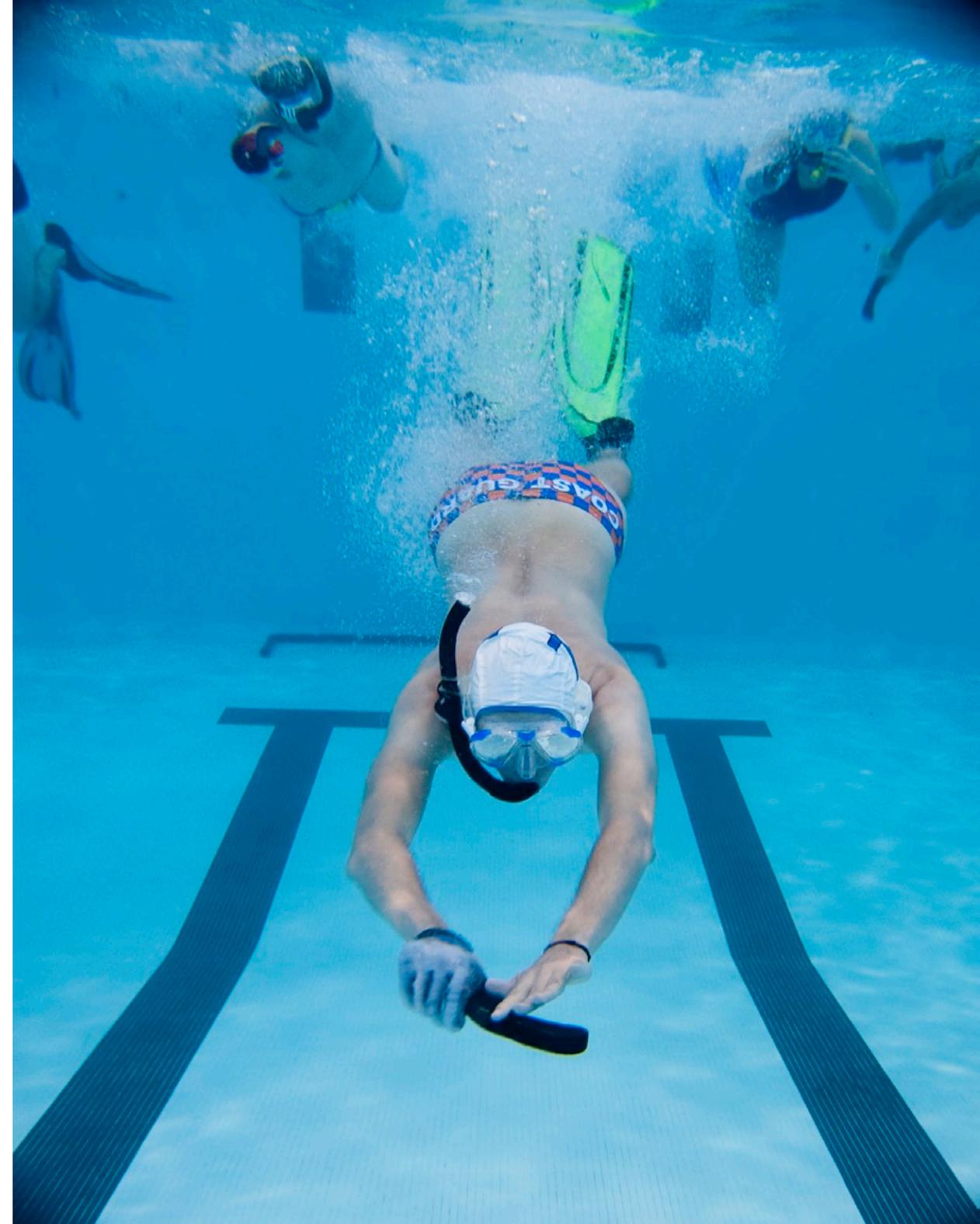
is also an avid player of the sport. Later, Collin formed an underwater hockey team at his high school and found the time to be rewarding both in and out of the pool.

"It was a blast," Collin said. "We would play underwater hockey on a Friday night, then go out for dinner and hang out. It was just fun for everyone."

Collin said his passion for underwater hockey seemed only fitting when he arrived at the academy.

"I figured, what better way to get a group of fun people together than to play underwater hockey," Collin said. "It wasn't even an option for me. I can't live without underwater hockey."

Putting the leadership skills he's learn-



ing at the academy to use, Collin rallied together a group of his fellow cadets to form an underwater hockey team. At first, many thought the idea of playing the game was a joke.

"The hardest part about putting the team together was convincing people that it's a real thing," Collin said.

To help convince his fellow cadets,

Collin turned to YouTube and its collection of more than 1,200 underwater hockey videos to showcase the legitimacy of the sport.

Coast Guard Third Class Cadet Vanessa Taylor, who now plays on the academy's underwater hockey team said, "I had no idea what underwater hockey was until Collin told me about it.

We watched some YouTube videos, and after that, I wanted to play. It's something different that not too many people have even heard of."

Like Taylor, Coast Guard Academy Fourth Class Cadet Toby Raine was also intrigued, but he too had doubts about whether or not the sport was real.

"I was on the rugby team when I first heard about underwater hockey," Raine said. "I asked Collin if it was a joke when I heard about it. After I started playing, I realized this is probably one of the best sports I could have tried out for."

The Club

After he built his team, Collin began the process of formalizing underwater hockey as an officially-recognized club sport.

The Competitive Club Sport Program at the academy is designed to offer competitive entertainment and physical enjoyment. The program exists to provide cadets with athletic and leadership opportunities as an alternative to existing Varsity Athletic Sports Programs. Since June 2010, three club sports have



THIS PAGE: Scenes from a vigorous game of underwater hockey played by team members at the Coast Guard Academy in New London, Connecticut. The underwater hockey club was initiated by Third Class Cadet Collin Sykes whose father, Robb Sykes, was also an avid player of the sport

legitimacy of underwater hockey, Collin was eventually able to introduce underwater hockey to a new group of individuals. Building on the leadership skills he's learning at the academy, Collin was able to form a team, rally support from his fellow cadets and get his childhood passion recognized as an official club sport at the academy—many of the skills he will eventually take with him when he graduates and enters the fleet as a U.S. Coast Guard officer. ■



been formed, including underwater hockey.

Coast Guard Lt. Cmdr. William Nunes is the director of Club Sport Activities and said in order to have a sport officially recognized as a club sport or activity, it must first have the interest of the cadets.

"In order to be recognized, cadets must first have an idea, then garner interest, provide a framework for their sport and draft and submit a charter," Nunes said.

For Collin, drafting the charter proved to be the biggest challenge in getting his team formed.

"It wasn't that hard to put the team together," Collin said. "I have a great group of friends who supported me, and

I'm not afraid to ask for what I want. It's just filling out all the paperwork that was the tough part."

Once the sport was officially endorsed by the commandant of cadets at the academy, Collin's team had the green light to move forward.

Life training

Playing the game alongside his son is the man who first introduced Collin to the game, Robb Sykes, who said the sport provides cadets with skills they can use when they leave the academy as officers and enter the fleet.

"One of the things this game really trains you to do is swim and hold your breath in rough water," Robb said. "The game is crowded, and you get kicked and jostled around while you're trying to accomplish your goals. If you ever get into a rough situation in a boat, you know what to expect. It's just good life training all around."

After convincing his fellow shipmates and multiple academy officials of the



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Dutch Navy finds intact WWI German Sub in the North Sea

The Royal Dutch Navy have located a German U-boat that was lost 94 years ago in the North Sea, the Dutch Ministry of Defense announced in April. The Hydrographic Survey Vessel *HNLMS Snellius* found the missing *SM U-106* submarine was found about 40 miles (64 kilometers) north of the Dutch island of Terschelling.

The German submarine *SM U-106* was lost in a minefield on 7 Oct 1917 about 40 miles north of Terschelling while homebound.

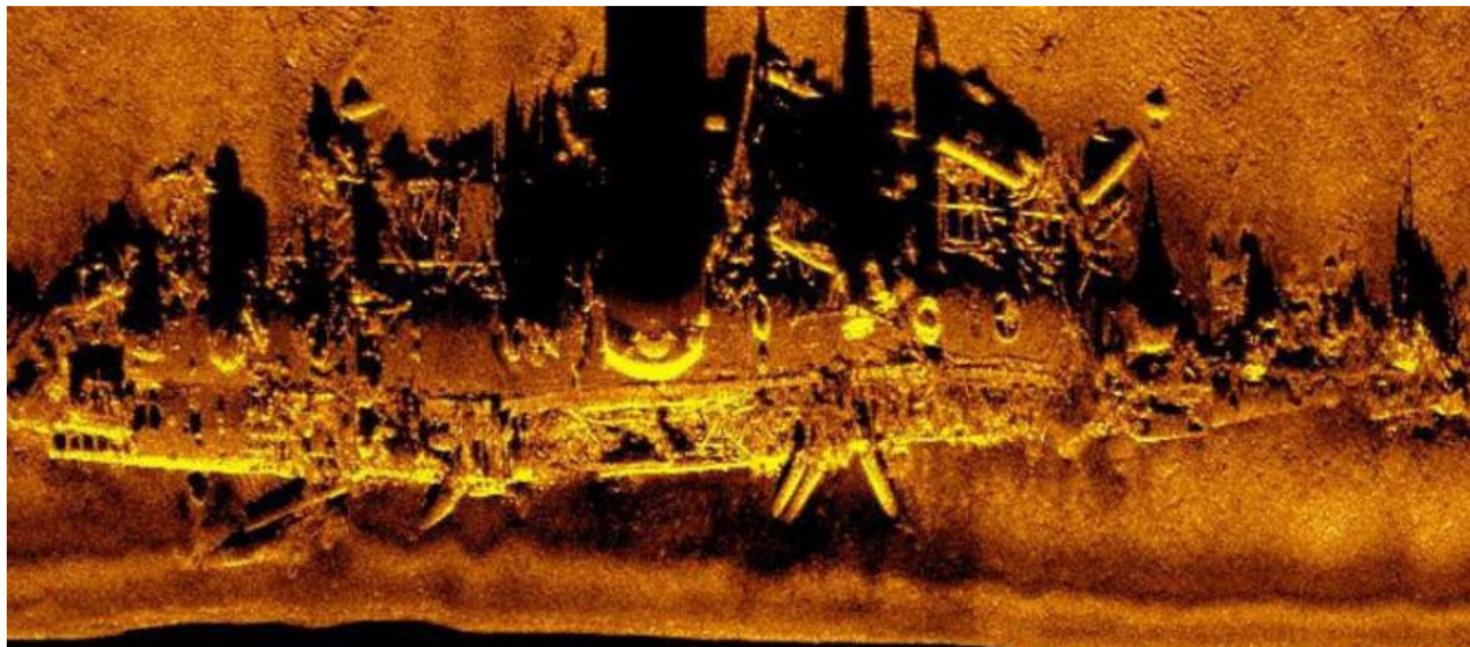
The wreck was already discovery by the Dutch Navy vessel *Hr. Ms. Snellius* in October 2009, but the find was not announced to the public until April 2011. "The news is only now released because the information had to be confirmed by German authorities and, where possible, relatives informed," the Ministry said in a statement.

In October 2009, the *Hr. Ms. Snellius* reported finding an unknown object while trying to map out water routes. A couple of months later, a second Navy vessel examined the site with an underwater camera, which showed what appeared to be the remains of a submarine.

In February 2010, another Navy vessel again examined the site and was able to recover a large cylindrical air tank. The tank had several serial numbers that were registered to the *SM U-106* sub-

marine, which went missing in the region in 1917.

U-106 was commissioned on 28 July 1917, under the command of Kapitänleutnant Hans Hufnagel, and participated in one wartime patrol starting on 2 September 1917. On 18 September 1917, during the First Battle of the Atlantic, *U-106* was credited with the sinking of *HMS Contest*—an *Acasta* class destroyer—and damaging *City of Lincoln*—a 5,867-ton steamer—in the Western Approaches. ■



Captain Morgan's lost cannon recovered in Panama's waters

An international team of marine archaeologists has recovered six iron cannon from a reef in shallow waters not far from the mouth of the Panama Canal. They believe the weapons were lost during one of the less glorious chapters of British adventurism in the 17th-century featuring Captain Henry Morgan.

Admiral Sir Henry Morgan (ca. 1635 – 25 August 1688) was a Welsh admiral and privateer, who made a name for activities in the Caribbean, primarily raiding Spanish settlements. As the third most important Spanish city in the New World, Porto Bello—in modern-day Panama—was an obvious choice for the bucca-

neers. Furthermore, Porto Bello was considered the center of Spanish trade in the Americas, as its warehouses contained the goods and valuables of many wealthy merchants. With its enormous concentration of wealth, Porto Bello was extremely well protected by three Spanish forts.

With information gained from a prisoner, the Buccaneers were able to surprise the first fort. Not long after this, the Spanish counterattacked in an attempt to protect their wealth and center of trade, but the buccaneers were ready for the battle, and Morgan organized an ambush of the fleet in a narrow passage. After defeating the much larger

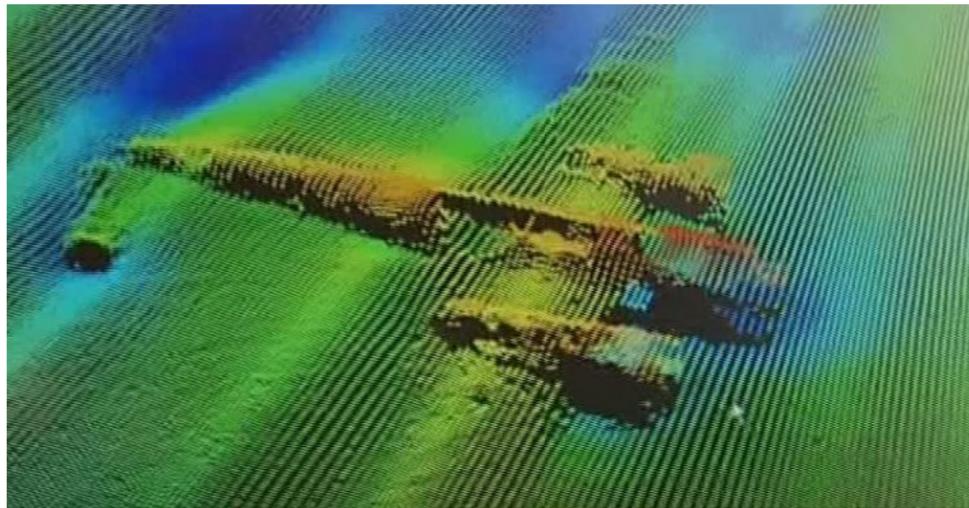


Admiral Sir Henry Morgan

and more powerful Spanish fleet, Morgan and his men continued to inhabit Porto Bello for two months. During this time, they collected all of the wealth of the city that they could find, and ransomed the Spanish for the safety of its town and citizens. ■



Dornier 17 from WWII found to be in great condition



New sonar pictures from the well-preserved wreck has just been released

The discovery of a unique German warplane off the Kent coast last year left experts “incredulous”. New images suggest the Dornier 17 is still intact. Hopes are it can be salvaged and put on display.

The twin-engined Dornier 17 Z-2, serial number 1160, of number 7 squadron, 3 Group, third Bomber Wing, was shot down on 26 August 1940 and made an emergency landing in the sea just off the Kent coast. The wreck of the plane sank some 50ft (15.24m) to the bottom, turning turtle as it did so, and came to rest on its back on the notoriously shifting Goodwin Sands, which soon covered it and protected it until it was discovered last year.

The German bomber, nicknamed the Flying Pencil, was one of the mainstays of the Luftwaffe bombing fleets, which began their assault on British cities and RAF airfields in the summer of 1940, in what became known as the Battle of Britain. A total of 1,700 Dorniers were built, but the plane discovered in Goodwin Sands is thought to be the last remaining one. ■ SOURCE: BBC, LONDON PORT

* See X-RAY MAG issue 38, p 21

70 new wrecks found off Cornwall

When the U.K. Maritime and Coastguard Agency (MCA) held its annual CHAS (Civil Hydrography Annual Seminar) on February 24, many images were shown of wrecks that had previously not been surveyed. The record for largest number of new wrecks must go to the survey of the North Devon and Cornish coasts, previously marked as ‘unsurveyed’ on charts, where some 70 new wrecks were found. ■

End of Navy vessels for artificial reefs?



An environmental group, the Basel Action Network, said it makes sense creating shipyard jobs in the United States instead of a “potential toxic mess at sea”.

“The Obama administration’s new plan to recycle these four aircraft carriers appears to be a signal that the administration may be correcting long-standing misguided policies that not only squander resources, but American jobs as well,” stated Colby Self of the Basel Action Network, a group that monitors global toxic issues and that last December issued a report critical of the artificial reefs.

The four decommissioned carriers are:

- *USS Constellation*
- *USS Forrestal*

- *USS Independence*
- *USS Saratoga*

The U.S. Navy would not comment, but Navy records show that bids are being accepted to dismantle the veteran ships. Self said the *Forrestal* alone has some 40,000 tons of recyclable steel, copper and aluminum.

Meanwhile David Booth, an expert from the University of Technology in Sydney, says that there is a need for more scientific research into the environmental effects of using offshore platforms as artificial reefs.

He said fish and other

marine life are attracted to offshore platforms for the protection they provide, and with 6,000 units to be decommissioned by 2025, including 60 in Australia, it seems like a win-win solution. But Booth warned more work is needed to determine if the practice is beneficial to the ocean environment. The great hope for rigs as reefs is whether or not they aid in spawning generations of marine life. Only one study worldwide has conclusively proven that sunken rigs have contributed in a net positive way to the environment around it. ■

Pieces of Eight



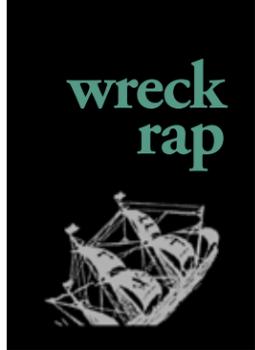
Silver Treasure Coins of the 1622 Shipwrecks
Nuestra Señera de Atocha
Santa Margarita
& the Portuguese Carrack *São José*

by Carol Tedesco



Fully illustrated with hundreds of finely detailed photographs, *Pieces of Eight* is more than just a reference book. Carol Tedesco not only explains the subtle nuances of the coins themselves, but places them in the context of their moment in history, explaining where they were coming from, where they were going and why.

To be released in 2010 by
SeaStory Press, Key West Florida.
To be on our availability e-mail alert list,
please inquire at lostgalleons@aol.com.



Centuries-old gold and emerald ring discovered by divers on historic shipwreck site

Text by Carol Tedesco

Only a few days into launching their 2011 search and recovery season, divers for Keith Webb's Blue Water Ventures of Key West have discovered an elegant gold and emerald ring, along with a gold "flake," a piece of ornate silver, a silver "piece of eight" treasure coin, and numerous pieces of scattered shipwreck material in an area of the Florida Straits where the treasure galleon, *Santa Margarita*, was destroyed in 1622.

Joint-venture partners of Mel Fishers Treasures—the company



Dan Porter, Captain of the *Blue Water Rose*, described the ring as "a magnificent square cut emerald—very dark and very clear—probably about 1.5 to 2ct and absolutely beautiful!"

that first discovered a rich 23-foot-long section of the ship's lower hull in 1980—and the Blue Water team have been exploring a series of widely dispersed artifact trails that resulted from the destruction of the ship. Contemporaneous eyewitness reports from survivors of the disaster described the vessel as having been swept on the crest of a wave over a barrier reef and driven forcefully into a sandbar, where hurricane force wind and waves beat the vessel to pieces.

Found!

Describing the moment that crew-diver, Sean Hogan, emerged from the sea with the centuries old emerald ring, *Blue Water Rose* Captain Dan Porter said, "I knew by the smile on his face what the color the object in his tightly closed fist would be. When Sean opened his hand not only did I see the gold I was expecting, but also a magnificent square cut emerald—very dark and very clear—prob-

Diver, Sean Hogan, member of Keith Webb's Blue Water Ventures team, holds the solid gold emerald ring he found at the wreck site of the 1622 Spanish galleon, *Santa Margarita*, off the U.S.-Florida coast



ably about 1.5 to 2 ct. and absolutely beautiful. Sean has been with us about six months and is one of the strongest divers I have ever worked with."

Hogan, who discovered the ring while diving with his leg in a cast, moved to Key West from the Chicago area in 2009 to attend the dive training program at Florida Keys Community College. "When I first spotted the gold I thought it was the link of a chain," he said. Then I pulled it out and saw the dark, dark emerald. It was my first time seeing gold underwater, and when you see it, you just know it."

Archaeologist James Sinclair described the ring as a "wonderful example of the baroque style popular during this period," adding, "while relatively simple and unadorned in design, the use of gold and emerald speaks volumes as to the culture from which the owner and the object originated. Gold, then as now, was a symbol of status, so the owner of this antiquity was a high ranking and wealthy individual."

Discoveries by Webb's team on the *Santa Margarita* site since 2006 are valued at more than 16 million and include gold artifacts, chains and jewelry, gold bars, rare silver coins, weaponry, pre-Columbian treasures, and a lead box containing 16,184 extremely rare natural pearls.

Research by renowned historian Dr. Eugene Lyon indicates that over 800 ounces of registered gold, 145 silver bars, more than 80,000 silver coins, and potentially multi-millions in contraband and personal jewelry and wealth from the *Santa Margarita* still remain to be found.

For more information on *Blue Water Ventures* of Key West and the search for the *Santa Margarita*, visit www.bwvkw.com. ■

Aug. 27 - Sep. 11
Manta Fest
 Yap Island, Micronesia
www.MantaFest.com

- UW shoot-out
- lectures by true pros
- sharks, mantas, macro

while you're at micronesia... let's go the whole hog!



- with Frank Schneider, Tim Rock, Marty Snyderman, Peter Schneider
- attractive travel and material prizes
- both DSLR & point & shoot cameras
- no participation fee
- the only shoot-out to feature the category *Sharks & Mantas*

YEARS



Manta Ray Bay RESORT & Yap Divers
mantaray.com





Nautilus Swell hits the waves



The *Nautilus Explorer*—the legendary liveaboard that pioneered diving in Alaska and British Columbia—has gotten a sistership; The *Nautilus Swell*, a beautiful, classic 90-foot vessel. With a recent US\$3.5 million restoration and perfectly set up for divers, the folks at Nautilus intend to make the *Nautilus Swell* a diving legend in her own right.

With 19 years of dive charter experience in B.C. and Alaska, the folks at Nautilus have a pretty good idea of where to take you for the most amazing possible vacation. From calving glaciers and climbing onto icebergs, bubbler net feeding humpback whales, eagles, grizzly bears, pulse pounding dives with Steller sea lions and giant octopus, impressive wrecks like the

Princess Sophia and Princess Kathleen to walls that are so covered with brightly coloured corals there isn't a square inch you can touch. There are seven guest cabins all with ensuite heads and showers and individual temperature control. The *Nautilus Swell's* modern galley is fully equipped as a commercial kitchen to allow the chef to produce an imaginative and fresh cuisine

Worldwide Dive and Sail Announce New Destinations in Asia 2012

From May 2012, the *SY Oriental Siren* will be offering ten night trips to both Layang Layang and Timor-Leste. Launching in Thailand in November 2011, the newest addition to Worldwide Dive and Sail's fleet of luxury liveaboards will spend five months in Thailand and the Andaman Islands before the long journey to Sabah, Malaysia.

Between May and June, hammerhead sharks, eagle rays and schools of barracuda and tuna are frequent visitors to the reefs of Layang Layang and the Spratly Islands positioned some 200 nautical miles off the coast of Sabah. Trips are ten nights in duration and depart from and return to Labuan, easily accessible from Kota Kinabalu or Kuala Lumpur. The first two days will be spent close to Labuan diving several wrecks before continuing on to Layang Layang for eight days. "Other tour operators offer just a five-night itinerary, whereas our ten-night program allows divers more time to explore the many sites and visit reefs that, as yet, other companies have not been able to reach," explained Worldwide Dive and Sail.

After the season in Malaysia, the *SY Oriental Siren* moves again this time

southeastwards to Timor-Leste. This young country is to be found on the eastern side of the island of Timor, which it shares with Indonesia. Following successful negotiations with the Timor-Leste tourist department, Siren Fleet will be the first and only liveaboard to operate in the region, introducing divers to reefs along the northern coast and the rarely-visited islands of Atauro and Jako. From reef sharks, dugongs, schools of trevallies to an amazing diversity of critters, the young country's reefs are comparable to those in nearby Indonesia. Ten-night diving safaris will run between August and November. ■



Siren Fleet Liveaboard safaris to Malaysia and Timor-Leste

C-Quester Sub-rides in the Med



Pictures from the submersible in the south of France 2009

As of May, the three-person C-Quester 3 submarine will be available for charter, through client, Med-Explorer, in the Mediterranean Sea between Marseille and Monaco!

Companies, individuals or couples can charter the Med-Explorer for a minimum of a day. This includes a well-trained pilot, a support boat and everything else needed to ensure a memorable, exciting and fun submarine dive experience.

This is definitely an exceptional adventure full of discoveries and excitement for everybody who is looking for the atypical exclusive underwater experience. ■

Green Short Challenge Cayman

Ocean Frontiers has set out a challenge for divers to visit each of the 55 dive sites within the East End dive zone in Grand Cayman. "We consider The Green Short Challenge the equivalent of earning your stripes, or in this case, earning your shorts. Golfers aspire to wear the Green Jacket of the Masters Tournament, Cyclers dream about wearing the Yellow Jersey of the Tour De France, but in the dive world, it is all about your pair of Green Shorts."

The Green Short Scuba Log book will be provided to help divers track and verify which of the 55 dive sites they have experienced and to mark them off their list by receiving a verification stamp from the dive shop after each trip. There is no time limit to completing the challenge and your quest can be spread out over as many dive vacations as you choose. All of the dive site illustrations contained within the log book are from real photographs taken of our hand drawn, dive site briefings boards, all done from the deck of Ocean Frontiers' dive boats. Upon completing the Challenge you will receive an engraved trophy and have a plaque in your name installed on our Green Short Wall of Fame. Only after completing the challenge can you truly appreciate the diverse beauty and wonder of the magical East End diving. www.oceanfrontiers.com

Amos Nauchoum to offer Humbolt Squid trips

Amos Nachoum of Big Animals Expeditions is offering divers the exciting opportunity to dive with one of the ocean's most formidable and misunderstood predators—the Humboldt Squid.



The week-long expedition is a first-time collaboration with an experienced Humboldt Squid skipper who has led filming projects

for *National Geographic* and the BBC. While Humboldt Squid trips are typically conducted on fishing boats, this expedition will travel in comfort and safety aboard the

X-RAY MAG READERS SPECIAL OFFER:

\$500 reward for reservation received by 1 July 2011 on any of BigAnimals expedition for departures in 2011 and 2012.

Readers need to sign in using the code — X-Ray magazine.

Sandman—a private 58-foot Hatters. Powered by twin engines, the vessel features three double cabins with in-suite head and shower. Fully air conditioned, it comes equipped with a diving platform, air compressor, and scuba tanks.

Expeditions will depart from La Paz on the Baja coast, cruising north toward Santa Rosalia—the Humboldt Squid capital. Enroute, divers will have the opportunity to swim with hammerhead sharks and visit a sea lion rookery. Three days will then be spent diving with the fascinating creature that is the Humboldt Squid. Diving will be conducted in the early evening, midnight and early morning. In addition, test dives will be launched with the squid in the daytime. The first expedition is sold out, but a second departure is now available from 14-21 August 2011 at a price of US\$5,900.00 per person.

For more information contact: amos@biganimals.com or call 415 923 9865. www.biganimals.com ■

Solmar V joins the new DivEncounters Alliance



BARB ROY

Founded by Peter A. Hughes in early 2011, the mission statement for the Alliance is simple: "To provide a reliable, professional, and safe live-aboard scuba experience ensuring your vacation leaves nothing to be desired and meets, or exceeds, your every expectation..."

Each operator in the Alliance remains fully independent; allow-

ing for individual, tried & true protocols to remain unchanged but while sharing certain costs of business. The savings from this is re-invested by the partners and ensures the quality of every aspect of your vacation experience on any Alliance vessel.

The partners of the Alliance:

- Undersea Hunter Group - Cocos Island & Malpelo

Manta Fest Yap



SCREENSHOT - WWW.MANTARAY.COM

5th Annual Manta Fest Photo Festival, Yap, Micronesia 27 August - 11 September 2011

Come rub elbows with the top underwater shooters in the world at the 5th Annual Manta Fest Photo Festival in Yap, Micronesia, between 27 August - 11 September 2011. Along with the photo contest, activities will include a varied assortment of daily presentations and seminars. Photo pros

will include Tim Rock from Guam, Marty Snyderman from San Diego and Frank Schneider from Düsseldorf, Germany. In-house professional digital still photographer and videographer, Peter Schneider, will also be on hand to assist guests with their photographic and video needs.

- M/V Orion - The Maldives
- M/V Galapagos Sky - The Galapagos Islands
- M/V Solmar V - The Socorro Islands & Guadalupe Island

Divers and guests who book with Alliance members automatically earn "Alliance Awards" for diving within the Alliance - discounts, free hotels, upgrades, NITROX, and onboard boutique credits.

Each partner of the DivEncounters Alliance must meet strict guidelines on vessel safety and maintenance, have a proven track record of customer satisfaction, and is inspected and rated on a regular basis.

Learn more about the new DivEncounters Alliance by visiting: www.divencounters.com

Categories include Mantas/ Sharks, Macro, Behaviour, Reef Scenics, Land/Culture and People. The grand prize in each category is a 7-night/5-dive day trip to Yap with Manta Ray Bay Resort and Yap Divers. Second place in each category will be a copy of Tim Rock's great photo album about Yap (a US\$120 value), while third place will include t-shirts, mask straps and other dive items.

Nightly presentations will be held on the big outdoor screen at the Mnuw Restaurant as well as individual classroom seminars in the afternoons. The pros will also compile a presentation from the guests efforts to show on the last day with awards given to the winning participants.

For more information, visit www.mantafest.com or contact Bill Acker at bill@mantaray.com. ■

Dahab Festival 2011



Inspired by recent powerful events in Egypt, the people of Dahab have combined forces resulting in the the first-ever Dahab International Festival of Water Sports, Culture and Desert Adventure on 14-20 May 2011.

Showcasing local activities to bolster the the South Sinai's local economy, events will include a range of water-based activities such as diving and buoyancy challenges, free diving with experts and spectacular wind and kite surfing competitions. Things will liven up in the evenings with bands and parties all over Dahab. Experience Bedouin culture with events such as camel racing, a Bedouin party featuring local musicians, Bedouin bread making, desert walks, excursions and safaris.

The alternative side of Dahab will offer free yoga classes and taster sessions of healing treatments including Reiki, massage, crystals, facial rejuvenation and much more. Dahab's creative side will be highlighted during the festival with street art, exhibitions, movie screenings and a performance of its famous children's circus, Circ Bonboni.

For more information, contact dahabfestival@gmail.com ■





“Can you turn the engines down?”

Virgin Atlantic airline staff have revealed the most bizarre questions asked by passengers on flights, with “Can you turn the engines down? They’re too noisy!” topping the list.

In a recent survey of 3,000 Virgin Atlantic cabin crew, common questions from passengers ranged from “Please, can the captain stop the turbulence?” to “Is there a McDonald’s on board?” It seems many passengers are confused by the delicacies of pressurised cabins, with many asking if windows

can be opened. Others have been known to ask for directions to the showers, and where the children’s playroom is. Crew members have also been asked to book massages for Barbie dolls, entertain rowdy children and even help locate a missing glass eye.

Caroline Lynam, customer rela-

tions manager at Virgin Atlantic, admitted that being a flight attendant can be tough. “Virgin Atlantic crew will always go that extra mile to offer our customers the best possible service, but there are some requests that even we find somewhat challenging.” ■

Concerns for air traffic during volcanic ash cloud were legitimate

A new study has found that European aviation authorities were right to ground aircraft after the volcanic eruption in Iceland, just over a year ago.

The drifting plume of ash contained fine particles that were hard and sharp enough to put aircraft at risk from abrasion on windows and airframes and, more seriously, to melt inside jet engines and clog up cooling ducts—something that could have caused engines to fail and planes to fall from the sky, scientists report. The decision led to cancellation of 100,000 flights, leaving an estimated

ten million travellers stranded or delayed disrupted travel for ten million passengers and cost up to €2.5 billion. The flight ban led to criticisms from the airline industry, with some carriers accusing the Civil Aviation Authority (CAA) of overreacting.

The scientists said the results of the study could form the basis of a safety protocol for rapidly assessing the risk from future volcanic eruptions. ■

More flights to allow mobile calls

Whether you like it or not, in-flight mobile calls may soon be coming to an airline near you.

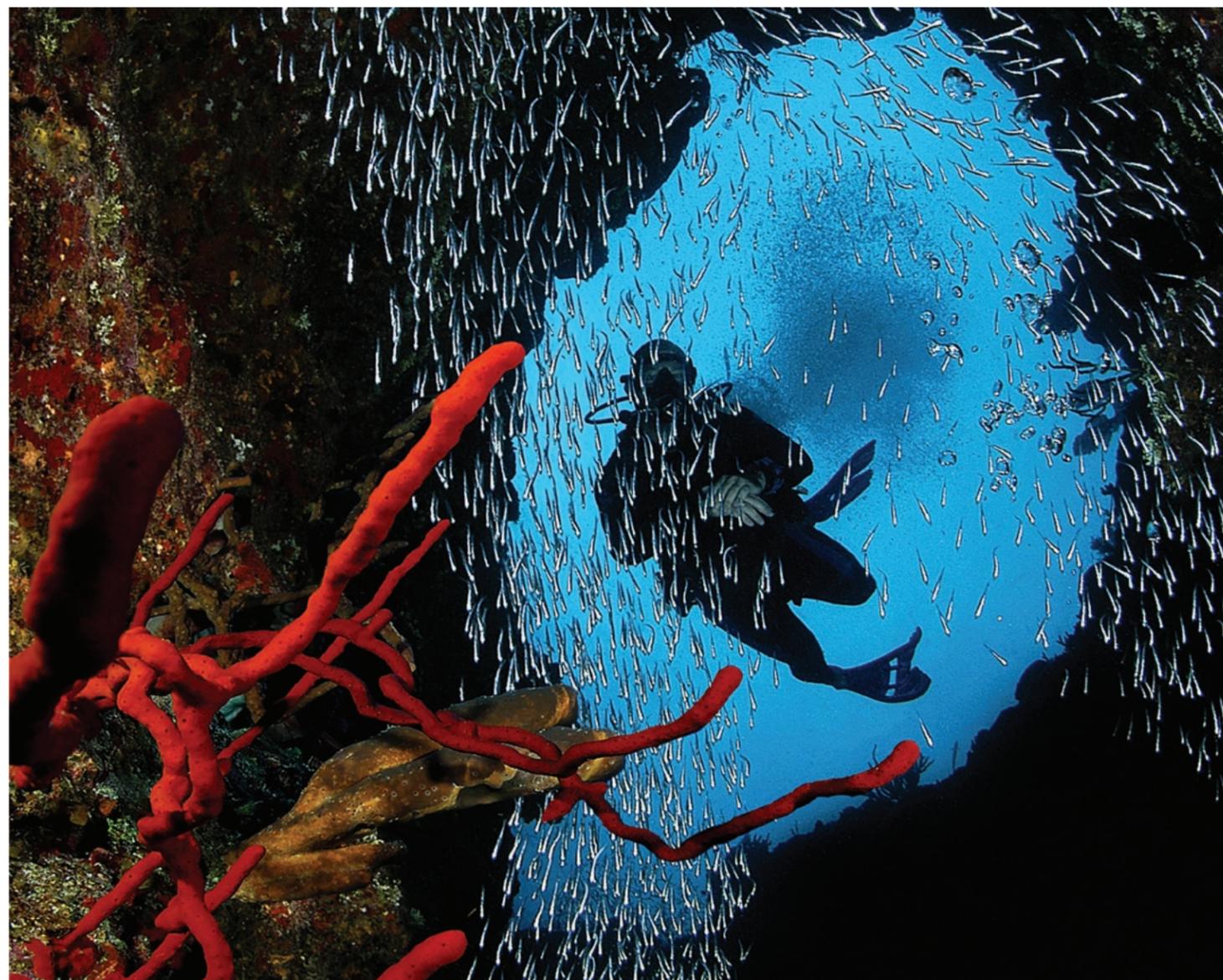
Air New Zealand recently signed up with Geneva-based OnAir, an onboard system that allows airline passengers to use mobile phones, laptops and other portable devices to communicate with the ground using voice and/or data connections. While some carriers, such as British Airways and Qatar Airways,

use OnAir to allow only data communications (text or e-mail), Air New Zealand joins several other airlines, such as Emirates, Malaysia Airlines, Royal Jordanian and TAP Air Portugal, that use the technology to allow mobile voice calls on certain flights. It’s a highly controversial notion in the United States where lawmakers have proposed laws that would ban in-flight voice calls. ■

No oxygen masks in aircraft lavatories

A new U.S. federal directive issued last month called for the removal of oxygen generators in airplane lavatories. All 6,000 or so domestic commercial aircraft now fly without oxygen masks in the bathroom, which would make for an unpleasant—if not life-threatening—situation for those in the loo when a plane depressurizes.

A follow-up interview with a spokesperson for the Federal Aviation Administration, by MSNBC, indicated that the move was designed to prevent terrorists from using lavatory oxygen to somehow fuel a bomb or otherwise ignite some kind of component within the lavatory. And that’s the exact reason why the FAA’s directive is just coming to light now, a month after the requirement to disable lavatory oxygen was made. ■



You haven’t been diving in the Cayman Islands? You haven’t been diving.

Breathtaking reef, wreck, canyon and wall dives, together with water temperatures of 27° and visibility of 30 metres make the Cayman Islands a diver’s paradise. You’ll encounter turtles, barracudas and stingrays and many more colourful and exotic species. Thanks to our rich marine life, it can get pretty crowded down there – but fortunately not with other divers. You see, we only allow one boat per site. An example of the depths we go to make this an unforgettable experience. THE OTHER SIDE OF THE CARIBBEAN.

caymanislands.co.uk



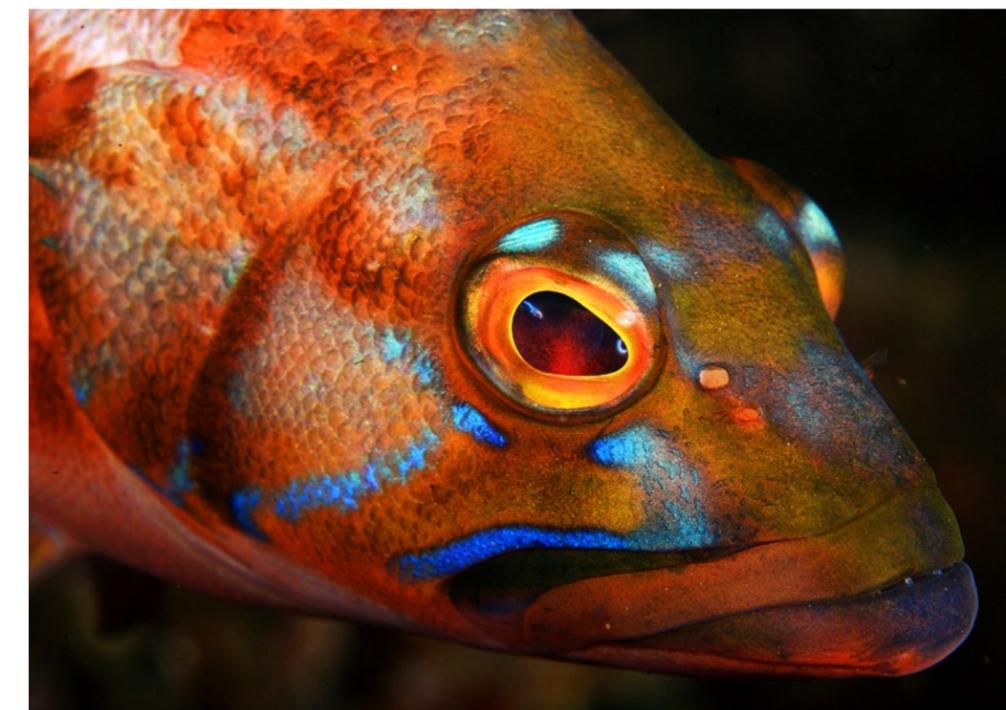
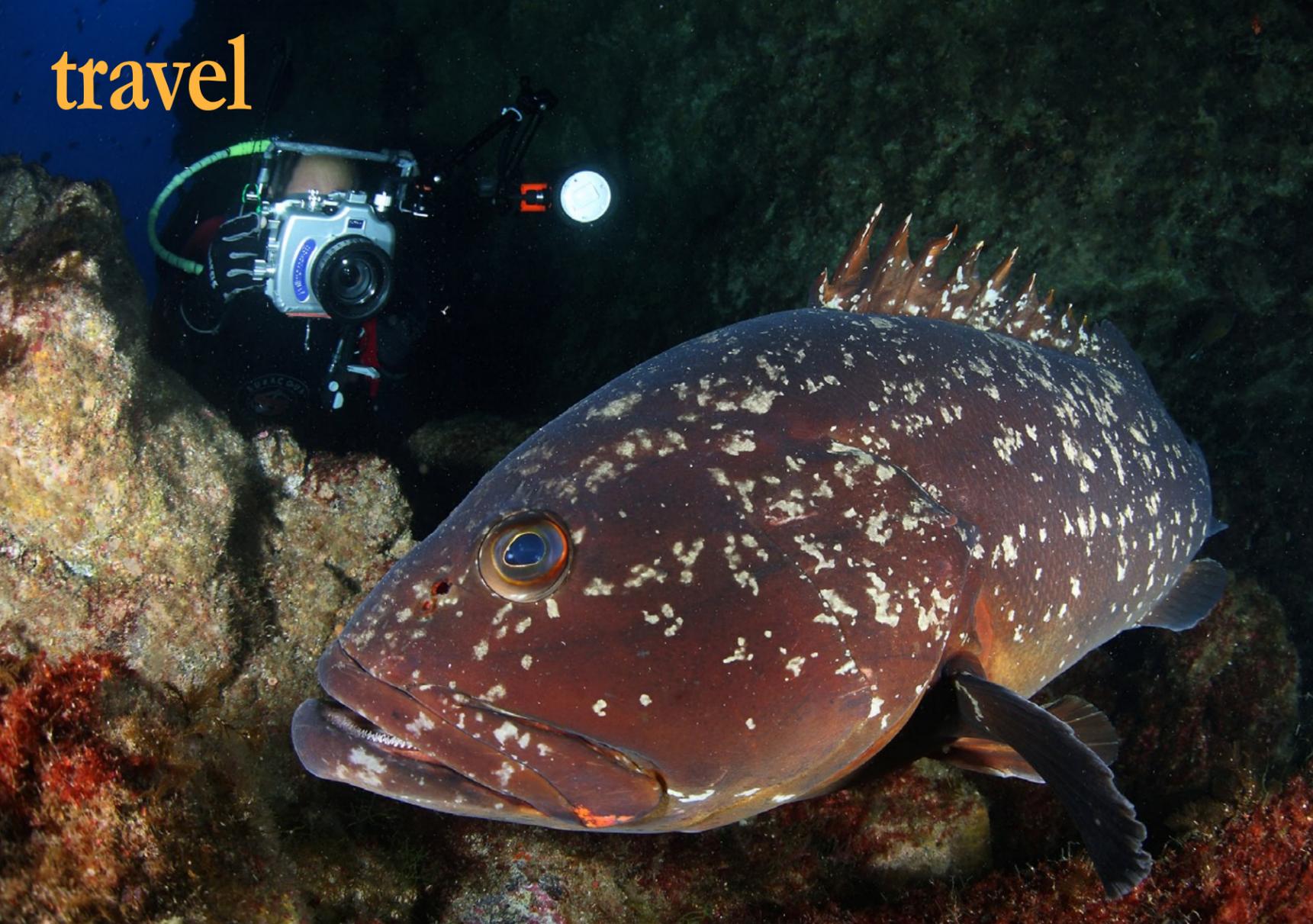
Grand Cayman • Cayman Brac • Little Cayman



An Oasis in the Atlantic **Azores**

Text and photos by Nuno Sá





It's been almost 15 years since my first visit to the Azores. I was studying law then and was on my first diving trip, with all of eight dives written down in my brand new logbook. Six years later, I was living in the Azores. I had traveled and dived in many remote locations by then, Africa, Australia, Asia... but one place never left my mind—those nine small islands that stood alone in the middle of the Atlantic. So, I hung my law degree diploma at my parent's house in Portugal and left for the Azores with a single goal in mind: to live in and discover a place with one of the highest levels of biodiversity in the world, and maybe even become an underwater photographer.

Friendly dusky grouper, Graciosa Island; Diver with curious common octopus, Faial Island; Blacktail comber, São Jorge Island. PREVIOUS PAGE: Wild dolphins corral and hunt prey in a bait ball

And it came to pass. After five years of diving in these nine islands as a professional nature photographer, I have seen the world's largest animal—the majestic blue whale—and dived with orcas, pods of sperm whales, dolphins, turtles, sharks, devil rays, whale sharks and many other fascinating creatures. But I am sure I can spend the rest of my life on these

islands without discovering all of the secrets the Azorean seas have to reveal.

Although whale and dolphin watching are the main tourist attractions of these nine islands, more and more divers are discovering this group of islands by exploring a myriad of dive sites where the visibility is startling and the presence of large pelagic



Azores



fish unique. Located in the middle of the Atlantic Ocean, almost half way between the United States and Europe, the Azores are a small oasis in the middle of a blue desert for many species that annually venture on Atlantic migrations. Located in the frontier of cold and nutrient rich currents coming in from the north and a ramification of the warm waters of the Gulf Stream coming in from the south, the upwelling effect of the only landmass between these two continents creates an explosion of life every year.

The beginning of this cycle starts with the spring “bloom” as water starts to get warmer and filled with microscopic algae, giving it a greenish hue. With it come the biggest and smallest of the ocean’s beings. As a frenzy of small zooplankton

organisms feed on the algae, they will soon serve as nourishment to giant travelers crossing the ocean. Blue whales, fin whales, Bryde’s whales, sei whales and minke whales arrive, stopping in these nutrient rich waters, gathering strength to complete their migration north to the cold Arctic waters. Undoubtedly, these large baleen whales will meet pods of sperm whales—the Azores’ resident giant of the seas, which hunts giant squid in the deep waters surrounding the archipelago.

When the first days of summer arrive, water gets clearer by the day as the food chain develops, the microscopic plankton gives way to large bait balls, and a multitude of predators follow. As the warm summer breezes arrive so do the more tropical species, such as large pods of Atlantic spotted dol-

phins, loggerhead turtles, devil rays, whale sharks and finally, large schools of fish.

Nine gems—one by one

The archipelago of the Azores is constituted of nine islands and spreads through 500km (311 miles). These nine islands are the most isolated in the North Atlantic, situated 1,300km (808 miles) from the southwestern coast of mainland Portugal. Diving is possible on all of the islands of the archipelago and range from shore dives to cave dives and wreck dives as well as diving in distant underwater mountains where dozens of manta rays and big schools of fish are common sights.

Divided in three groups (Eastern, Central and Western), the islands can be very close to each



LEFT TO RIGHT: Free diver surrounded by Almaco jacks, Santa Maria Island, Ambrósio; Pod of Sperm whales. Photo obtained under a special permit of Azores environment authorities; Friendly Loggerhead turtle, Santa Maria Island

PHOTO OBTAINED UNDER A SPECIAL PERMIT OF AZORES ENVIRONMENT AUTHORITIES



other in a group (just four miles from Pico to Faial in the central group), but up to over a hundred miles away from the next group. Each of these islands is so different from the other that it is hard to describe them as a whole. What they do have in common is peace and quiet, breathtaking volcanic landscapes and cows everywhere—roads included!

Underwater, these islands are as different as on the surface, with blue sharks on one island and whale sharks on another, or a World War II shipwreck on one island and 15th and 16th century wrecks on another. Coastal dives are, however rather similar throughout the archipelago. Being islands of volcanic origin, underwater rock formations can be very impressive, with large arches originated by ancient lava flows and deep caves with numerous

connections to various chambers.

The typical sea life includes large dusky groupers, curious trigger fishes, several species of little nudibranchs, morays and octopi in amongst the rocks. Colorful red hogfish are normally more common at a greater depth—20 meters or more—where the black coral (*Antipathella wollestoni*) branches are also quite common. Many small and colorful species can be sighted, such as peacock wrasse, parrotfish, Azores chromis (*Chromis limbata*) and Mediterranean rainbow wrasse.

Large schools of pelagic fish such as guelly jack, almaco jack, yellow-mouth barracuda, Atlantic bonito or—for the lucky few—a majestic devil ray, a turtle or an ocean sunfish are occasionally sighted on coastal dives, but the offshore underwater seamounts are definitely the place to visit for the big pelagics and are

what make the Azores a unique diving destination.

Western Group

Of the nine islands of the Azores, Flores and Corvo are the most distant and secluded, also being the westernmost point of Europe. Only ten miles separate these two islands, however, they are 130 miles away from the nearest island group. With less than 4,000 inhabitants—Flores Island and Corvo Island with 400—the so-called “Western Group” still offers the closest we can get to nature in its purest state, with waters that are pristine, unpolluted and almost untouched by humankind.

But visiting these two islands is not just a unique experience underwater, as these islands have breathtaking landscapes and are off the beaten track of the more touristic islands. *Flores*, in Flores Island, liter-

CLOCKWISE FROM TOP LEFT: Group of devil rays at offshore underwater seamount; Cows on the road, peace and quiet. View of Faial Island from Pico, Central group; View of Corvo Island from Flores, Western group



ally means *flowers* in Portuguese, and the island can best be described as “Hawaii in the Atlantic”. Beautiful waterfalls cut through the green landscape and lagoons, and there are flowers everywhere. Corvo, on the other hand, is only one-eighth the size of Flores with a total area of 17 sq km, thus being the smallest in the archipelago.

Although small, Corvo Island offers its visitors, without a doubt, one of the world's most unique and beautiful landscapes. The giant crater of the extinct volcano that occupies almost the totality of the island is composed of several small lagoons surrounded by green

meadows filled with flowers, as the outer ridge of the crater falls steeply into the blue sea. UNESCO has recently recognized the uniqueness of this natural heritage nominating it a Biosphere Reserve.

The only village on the island is the small village of Vila do Corvo, a picturesque town with white houses and cobblestone streets.

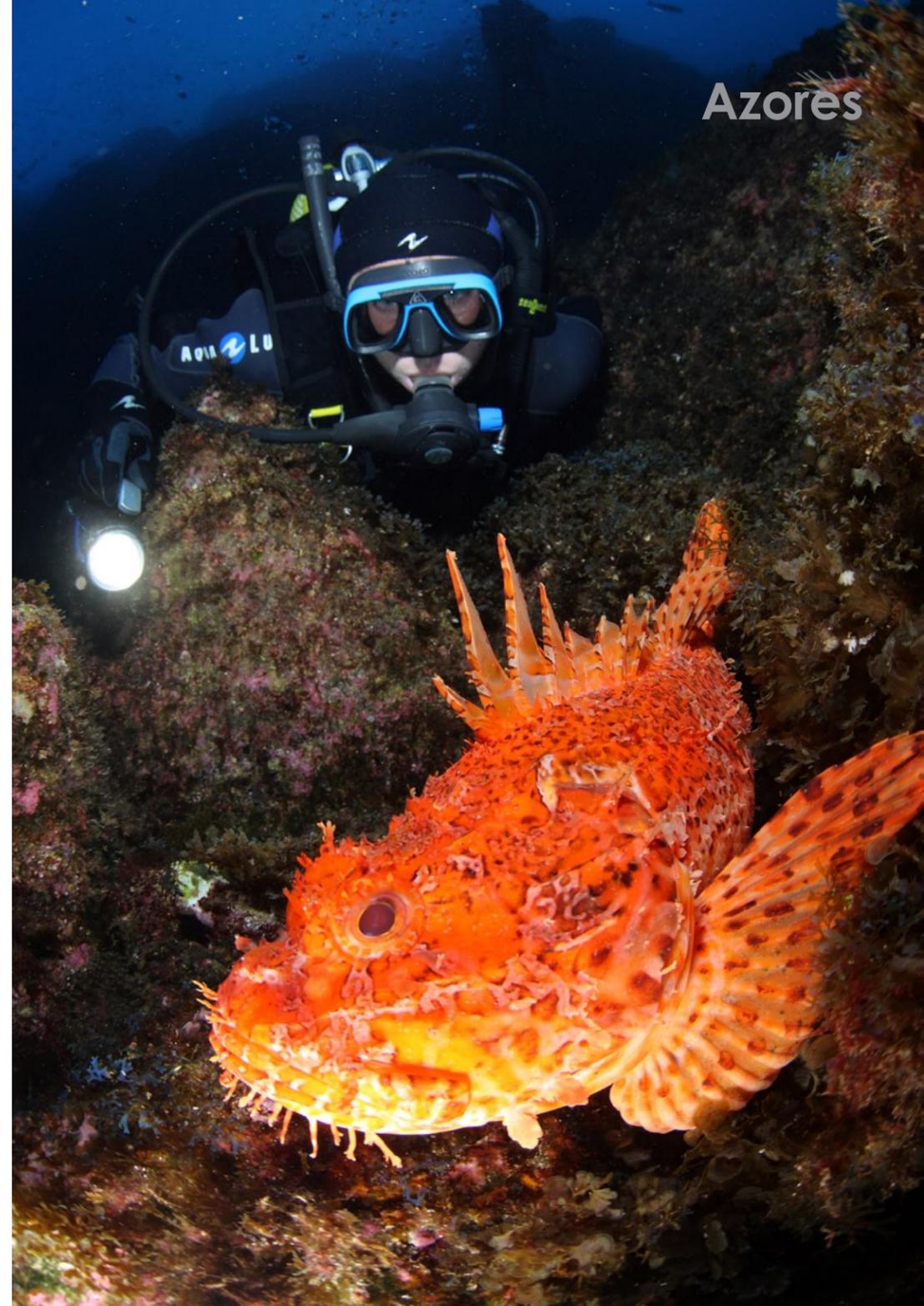
Due to its geographical isolation from islands with more developed fishing industries, the islands of Flores and Corvo still have a diverse and abundant marine life. Large schools of yellowmouth barracuda can be found here as well as almaco jack and jack

fish, an abundance of red hogfish, blacktail combers, various types of morays and so many other typical species of the Azores. On the boat crossing from Flores to Corvo many species of whales, dolphins, sea turtles and sea birds are usually sighted.

Corvo's highlight is undoubtedly the dive with the big dusky groupers at the Caneiro dos Meros dive site, located just 300m from the harbor. This is a natural reserve (amazingly it was voluntarily created by the island's fishermen) where you can dive with up to eight or ten large and friendly dusky groupers.

Flores, on the other hand, also has many

CLOCKWISE FROM LEFT: Corvo Island's crater—a Unesco natural heritage; Sperm whale fluke; Atlantic spotted dolphins; The “Triangle Islands”, São Jorge Island with Pico and Faial in the horizon



LEFT TO RIGHT: Diver explores Shrimp Cave, Faial Island; Rock goby (*Gobius paganellus*); Diver and red scorpion fish (*Scorpaena scrofa*)

diving spots on its extensive coast, one of the most famous ones is Gruta do Galo—a dive in a magnificent cave that ends under a freshwater waterfall in the sea. Most divers who visit the Azores “Western Group” take advantage of the proximity of the two islands to visit and dive on both of them. After all, it is just a one-and-a-half-hour boat ride between the two islands.

Central Group

Five islands stand relatively close by in the central group of the Azores. Amongst them Pico and Faial are the most visited by divers and are only four miles apart. Together with São Jorge Island, they form the islands of the “Triangle” with daily boat connections between them.

The islands of Terceira and Graciosa are relatively isolated from the rest of the group, so con-

nection by boat can be more difficult. Graciosa has excellent coastal dives, cave dives and a very good wreck dive—the *Terceirense* shipwreck—located just a few hundred meters from the coast. Terceira Island also has excellent coastal dives but is mostly known for its archeological dives.

Terceira's capital, Angra do Heroísmo, is a UNESCO world heritage site. Monuments and colorful

historic buildings are reminiscent of its historic importance in the 15th and 16th centuries as the main shelter harbor for ships crossing the Atlantic, with many stories of pirate ships and naval battles to be told. The historic importance of this city is present above and under the water, with several archeological diving sites. Although time has taken its toll over most of the fragile wooden ships, there are still many

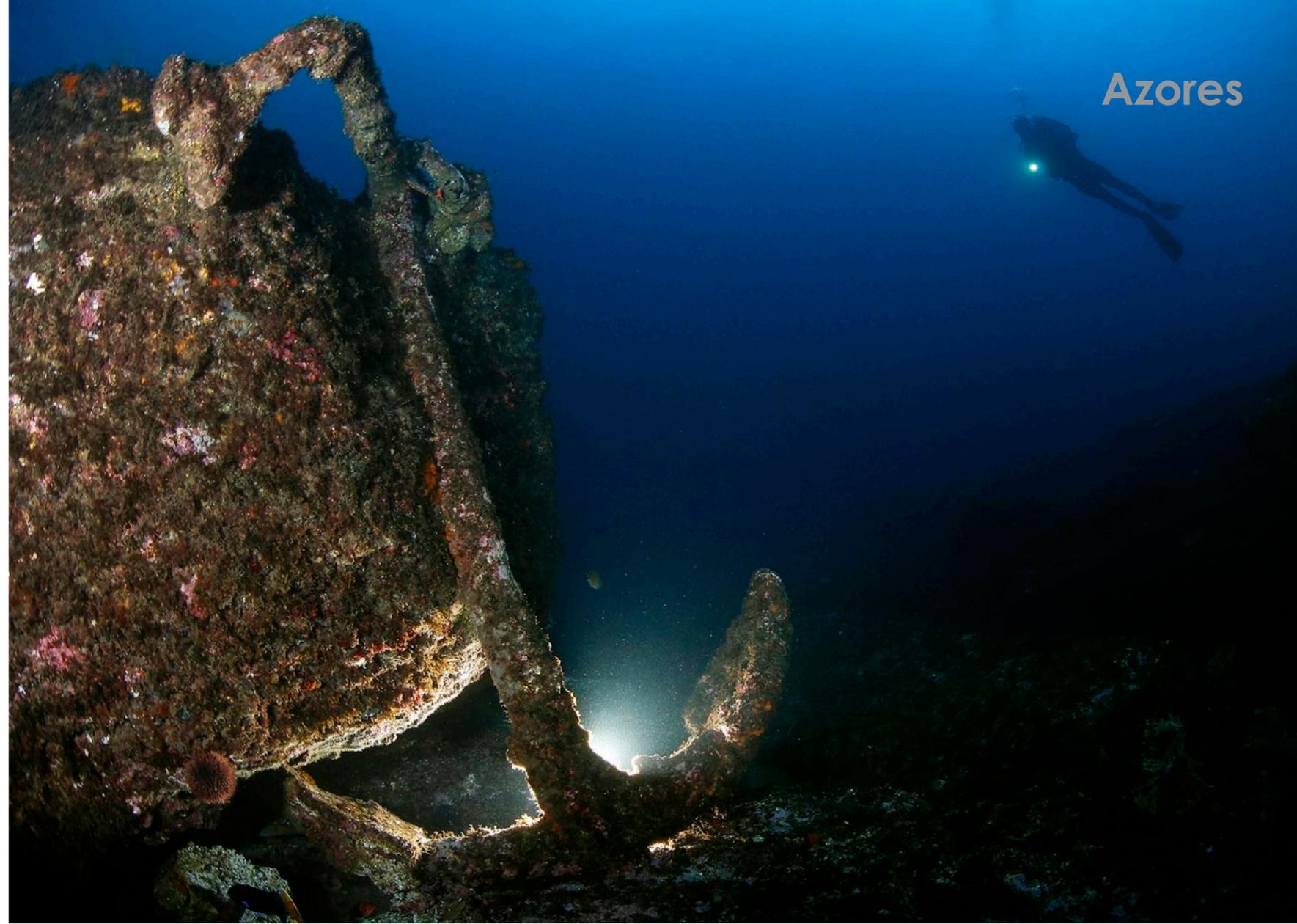
artifacts and wrecks that evoke ancient times.

One of the most interesting dives is the “anchor graveyard” where you can dive amongst over 40 large anchors, which range from the 16th to the 20th century, left by ships in distress, some of them over three meters long. The *lidador* shipwreck, a

19th century steamship that sunk just 50m from the coast when crossing from Portugal to Brazil, marks its presence in the bay—its shadow visible from the surface on days of calm sea.

Faial Island is well known as one of the world's most famous marinas, where sailors crossing the Atlantic usually stop for a few





Terceira Island's Anchor Graveyard has over 40 anchors, some over 3m long, from the 16th-20th centuries left by ships in distress

days, giving the small town of Horta a mystical look, with colorful sails filling its bay. Just across the strait channel, Pico Island seems to still be erupting from the sea floor into a volcanic mountain over 2,000m high.

Both of these islands are the main access points to two of the Azores' most famous diving experiences: the Princesa Alice offshore seamount and diving with blue sharks in high seas.

Diving in offshore seamounts are amongst the best dives these islands have to offer, and the Princesa Alice dive site is definitely second to none. Located about 45 miles off Faial island (a three-hour trip) this seamount erupts

from the sea floor from over 500m deep up to around 35 meters.

Offshore dives in high seas are completely unpredictable, but big groups of curious devil rays and big schools of up to thousands of large pelagic fish, such as yellowmouth barracudas, jacks, and especially Atlantic bonitos, are among the main attractions. Several species of sharks, ocean sunfish or manta rays can also be sighted. Of course, being the Azores home to over 20 different species of whales and dolphins, the trip to Princes Alice always includes some ocean travellers such dolphins, sperm whales or loggerhead turtles.

These two islands are also one of the few places in the world where you can dive with one of the seas most beautiful predators—the blue shark. Diving with blue sharks is done “in the blue”, either snorkelling or scuba diving, and is definitely an unforgettable experience. Just minutes after a container with bait hits the pristine water, subtle shadows can be seen shooting from hundreds of meters deep, straight to the surface. Cautious and elusive at first, as confidence is gained, these predators of the deep are extremely curious, approaching and inspecting every diver, sometimes even slightly brushing divers, receiving a tactile test

Terceira Island *lidador* shipwreck—a 19th century steamship



Peacock wrasse, Formigas Islets (offshore dive 25 miles from Santa Maria Island)



Curios grey triggerfish (*Balistes capriscus*), Pico Island (left); Blue Shark (*Prionace glauca*), Pico and Faial Islands (below)

Azores

are about 50 miles from each other and over 70 miles from the central group. The largest island—São Miguel—is the capital of the Azores, and is known for its natural beauties, with amazing landscapes marked by green mountains and blue lagoons. It is, however, also the most developed island. Coastal dives can be less thrilling due to a larger fishing industry. However, the presence of a World War II shipwreck just five minutes from the marina makes this the most visited diving spot in the Azores.

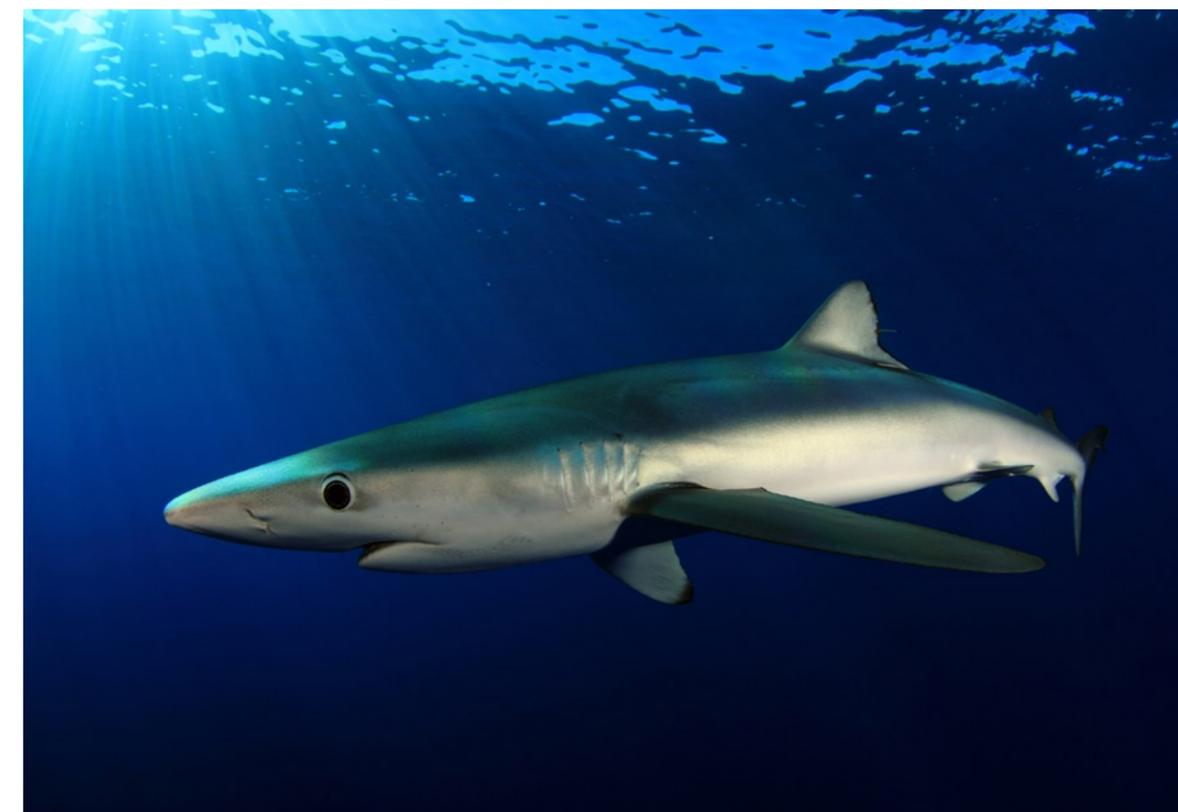
Built in the United States in 1943, the Liberty Ship took part in the world's

from its sensitive lateral line. On a normal dive you can have between three to five blue sharks around you. If you are lucky, you can also see the open ocean's top predator and fastest fish—the mako shark.

Pico is also the birthplace of what has become the tourist symbol of the Azores—whale watching. The Azores is one of the world's top whale watching destinations, with the chance to spot 23 different species, and with large pods of sperm whales all year long. Along the mountainous coast of Pico and Faial islands several small looking points are daily occupied by "Vigias" (look outs), armed with binoculars and a radio tracking the horizon for whales and dolphins, and giving directions to the fast zodiacs.

On a typical summer day it is normal to sight up to four or five different species of whales and dolphins as well as several species of sea birds, turtles and who knows what else. Swimming with dolphins in high seas is an unforgettable experience. Swimming with whales, however, is not allowed.

São Jorge Island—the third island of the "Triangle"—is less known for its diving than for its breathtaking landscape and offers excellent coastal dives as well as a well-known offshore



dive—Ponta dos Rosais. This is an excellent dive with many schools of pelagic fish, however the typical sea-mount groups of devil rays are rarely seen here.

Eastern Group

The two Islands of the eastern group

largest military operation—operation Overlord off the coast of Normandy. Originally called *Edwin L Drake*, it would find its resting place 21 years later off the coast of São Miguel with the name, *Dori*. Today, this 130-meter-long wreck is visited by hundreds of divers every year. Located on a sandy



Vineyards descend into the sea on Santa Maria Island (left); Portugal's highest mountain, Pico Island (above)

bottom just 16m deep, this is probably the best and easiest accessible wreck dive in the Azores, with many parts of the ship still intact and the typical species of the Azores sea bottom present in great numbers.

Santa Maria is probably the Azores "best kept secret"—a small island with white sandy beaches and completely off the beaten track, with whale sharks and groups of dozens of devil rays just 30 minutes from the harbor! Although big groups of devil rays are typically seen on offshore seamounts, Santa Maria is the only island of the Azores where you can see dozens of these majestic fish slowly gliding around divers, on a daily basis and just three miles from the coast. This happens in a place called Ambrósio, and you can literally see over 50 devil rays on a single dive, as well as large schools of pelagics and

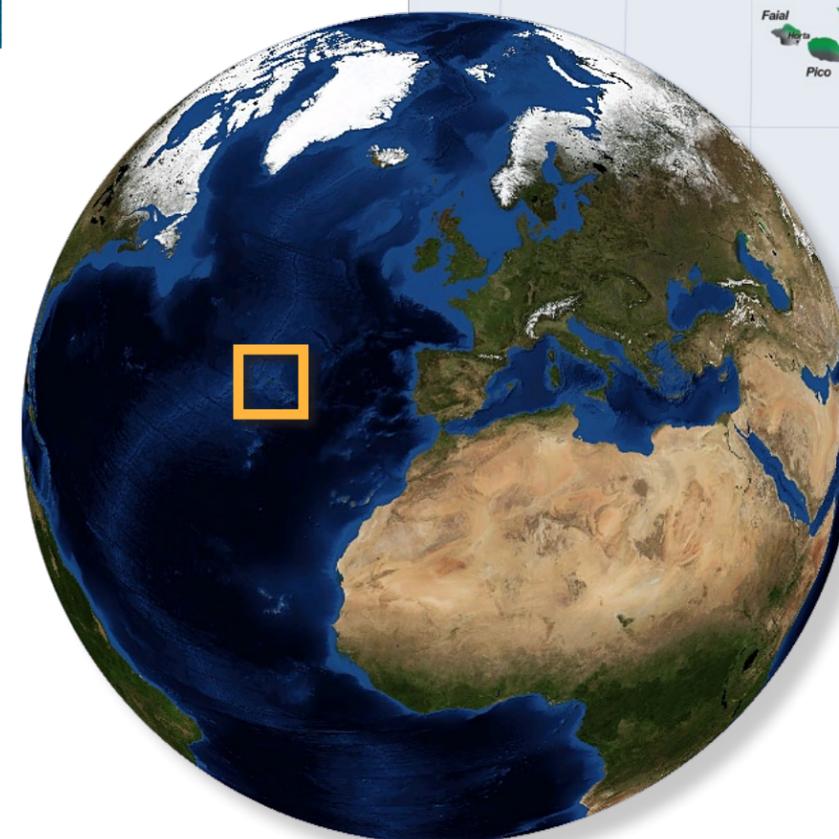
the occasional whale shark.

Up to three years ago, whale sharks were a very rare sight and mostly described by tuna fisherman after encounters in high seas. However, since 2008, the biggest fish of seas has chosen the island of Santa Maria to spend the summer. Nonetheless, spotting this colossus of the seas is not for the faint of heart, as they usually appear about six miles from the coast, so it typically involves taking a whole day specifically to search for them and being prepared for many hours out at sea. But when you do get lucky, the experience is priceless: pristine blue waters several hundred meters deep, shades of sunlight descending beneath you, and a massive whale shark followed by hundreds or thousands of tunas hitching a ride through the Atlantic—simply amazing.

Around 25 miles south from Santa Maria (or about 45 miles north of São Miguel) are two of the Azores most known offshore dives—Formigas and Dollabarát. Formigas has a series of small rocky islets in the middle of the ocean, where a small, uninhabited lighthouse was constructed to prevent ships from colliding (unfortunately there where many before it was built). Dollabarát is an underwater seamount just three miles from Formigas, so making the trip usually involves diving both sights. What both dives have in common is amazing visibility (up to 40m and more) and a chance to see oceanic pelagic fish such as big schools of wahoos, yellowmouth barracudas, jacks, and Atlantic bonitos, as well as curious devil rays, hammerhead sharks and the occasional manta ray or whale shark.



VARP / WIKIPEDIA / PUBLIC DOMAIN



Location of the Azores archipelago on global map (left); Map of island groups in the Azores archipelago (above)



Free diver surrounded by devil rays at the amazing dive site, Ambrósio, off Santa Maria Island (above); Black coral, Terceira Island (left)

Between dozens of devil rays at Ambrósio, going out for the whale sharks, taking a trip to Formigas and Dollabarat (including a few species of whales, dolphins and sea turtles that will probably be seen on the way there), and a few sunsets at Praia Formosa beach, it is no surprise that the divers that are lucky

enough to live these experiences like to keep this island a secret.

Visiting the Azores

These nine islands definitely offer some world-class dives and a unique experience of diving in a less touristic destination with amazing landscapes and a lot

of peace and quiet. With reasonable coastal dives and the chance to have some unique experiences in offshore dives, the Azores has dives for every taste and level of experience. However, thinking you can visit all of the Azores' "highlights" in just one trip is simply an illusion. The distance between islands makes some of the more isolated ones a destination of their own. However, it is possible to dive two or three islands in a one to two week trip and still have time for some whale watching and sightseeing.

When to go: July to September are the months with the warmest water, best weather, best visibility and best chances to sight pelagic species. Water can get as cold as 16-17C° in the winter, and an easy 25C° in the summer. Air temperature is not surprisingly pretty much the same as the water, since these islands are very

small and hugely influenced by the mass of water around them.

Getting there and around: There are airports and daily connections between all the islands, as well as regular boat connections during the summer. TAP and SATA have direct flights to the Azores from Lisbon and several other European capitals as well as Boston, Oakland, Montreal and Toronto.

There are two official boat operators in the Azores as well as plenty of private taxi services. Transmaçor (www.transmacor.pt) only operates in the central group, while Atlanticoline (www.atlanticoline.pt) connects all the Islands. Boat connections work very well in the Western Group (Flores and Corvo) and also between the Triangle Islands (Faial, Pico and São Jorge) with several daily

connections. However, moving between any other islands can sometimes be very time consuming and well worth the flight. However, if you don't mind taking a day off for the trip, it can be very nice (and cheaper) to take a trip along the islands.

Other than that, just relax and get into the Azores' easygoing ambiance. After your first visit, I'm sure you will feel you have discovered a small paradise in the Atlantic.

Nuno Sá is a Portuguese underwater photographer and author who resides in the Azores. A regular contributor for several magazines, including National Geographic, Sá is co-author of The Azores Diving Guide—Portugal's first published diving guide. For more information, visit: www.photonunosa.com ■

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POINT & CLICK ON BOLD LINKS



Edited by Rosemary 'Roz' Lunn

Equipment *rockin' and a rollin'*



Eezycut

This little nifty line cutter we actually got demonstrated for us, and it convincingly sliced through even thick lines with ease and simple movement. The small size of this cutter means it can be placed pretty much in any convenient spot. The Eezycut Trilobite is available in two types of pouch. A harness pouch, which fits onto any two-inch scuba webbing, and a wrist pouch. www.oceanedgeoutfitters.com

Beuchat 5 LED

This 5-LED light comes with anodised aluminium body and a detachable anodised aluminium handle. The specific shape of the rear housing—which consists of the handle, the control switch and the safety valve—fully protects the control switch against shock. This shape also allows the light to stand up and be used as ground lighting. The head is equipped with five 3-watt high luminosity LEDs, a central LED (10°) surrounded by four other LEDs (14°). Burn time is rated at three hours with one hour 30 minutes of maximum output. The lamp is powered by six 1.5 Volt AA alkaline batteries. Weight in air is 660g and 225g in water. www.beuchat.fr



Lightweight from Cressi

Cressi has introduced a new back inflation travel BC designed to help scuba divers wanting to make dive travel more affordable and enjoyable. Weighing in at only 2.5kg, this full featured BC has been designed with the traveller in mind. Made from 420 Denier nylon and buckles out of light alloys. According to the manufacturer's website it also comes with a 'fast system for a folding and compacting the BC'. www.cressi.com

Furyo computer

Italian Dive Systems new computer's two decompression algorithms support air, Nitrox, Trimix and can be used with scuba and rebreathers. The double algorithm has three operation modes: Bühlmann, VPM and controlled VPM. The user can set deco stops and variable mixes including two user-defined diluent gases for rebreathers. The Furyo switches between modes (ECCR, MCCR, SCR) even underwater. It has an automatic adaptation to altitude and comes with integrated buttons in the chassis, which is resistant to the ambient pressure, and the sensibility



doesn't change with depth. The computer features a 180° Flip LCD screen in which back-light and contrast can be set. Battery is user replaceable.

www.divesystem.com

C200 and C300

With the release of the C300 and C200 second stages, Scubapro has added two very compact regulators to their product range. Both models feature a diver-adjustable aligned coaxial VIVA for powerful inhalation assistance and prevention of free-flow and optimal Flow Design valve (OFD) for reliable and high air flow. The C300 second stage allows all the adjustment options of a high-end regulator while remaining a midrange system. The regulators are available with either 232 bar INT or 300 bar DIN MK25, MK17 or MK11 first stages.

www.scubapro.com



equipment



RS-680

The designation RS-680 tells you that this Tusa regulator is a combination of the R-600 second stage. The R-600 is a light-weight ultra-compact balanced piston first stage, weighing 630g. It comes with two H.P. ports and four L.P. ports. Also available are a cold water kit available for temperatures below 50°F/10°C and a DIN conversion kit (300bar/4350psi). The S-80 second stage has an elliptical low-profile case design and a new second stage design featuring a dual exhaust system, which consists of an enlarged primary and an auxiliary exhaust. The auxiliary exhaust, located on top of the S-80 elliptical case, works in union with the primary to significantly decrease exhalation resistance. Further features: Venturi adjustment lever, built-in moisture exchange plate, universal swivel joint, breathing resistance adjustment control and ortho-consciously designed mouth-piece. www.tusa.com



Camaro super elastic suits

According to the manufacturer, these suits are super soft and highly flexible. The highly elastic plush lining allows for an easy and comfortable dressing and undressing of the suit. The new High-Tec material allows for a perfect fit and 100 percent comfort. The correct positioning of materials in the right thickness is part of the concept for optimal mobility. The suits are available for men and woman in different sizes and are made in 7/5/3mm thickness.

www.camaro.at



Bring your iPad

The Grid iPad bag utilizes Watershed's ZipDry technology which has been rated for submersion up to 300 feet. The iPad is said to be usable while protected due to its 'window'. A protective, button down flap that covers the window when not in use. Available Colors: Black, Blue, Clear, Alpha Green, Red, Yellow & Multicam drybags.com

Stahlsac

The Curacao Clipper from Stahlsac is a full-sized but very light weight dive bag that is loaded with features. The bottom compartment is fully capable of accommodating a complete dive set-up, while the top compartment will hold personal clothing, additional gear and accessories. We have internal pockets for further gear organization. The entire bag is easily transported on a frame, which is light yet very durable. All frame components are fully serviceable so in the off chance



MB Sub Ypsilon

The German lamp specialist has released a new lamp in two version where the battery capacity makes up the main difference. The Ypsilon produces up to 1250 lumen, which, according to the manufacturer, is significantly more than a 50W halogen bulb can produce. A 10° spot reflector bundles the light into a softly spreading spotlight with a large diffused corona. Alternatively, a 20° medium reflector can also be installed. The Ypsilon2 is for those who want more battery capacity and comes with a housing that is 65mm longer. The lamp can also be upgraded to a canister-based system. Other features include two-step-dimming. The burn time at 100 percent output is 1.5 hours and up to four hours at 35 percent. Power source: Lithium Manganese battery 4,8Ah. The weight is respectively 550 / 740g on land and 250 / 270g in water. www.mb-sub.com

that damage does occur, it is quickly repairable. Compression straps secure goods in transit while the comfort handles on both the top and the bottom of the bag allow for effortless removal from auto trunks and other storage places. The Rum Cay Regulator Bag (top part) is a multi-functional regulator or computer carry-on bag. It features a roomy main compartment full capable of accommodating a regulator set up, a 17-inch screen laptop, dive computer or console and other accessories. It has external pockets for travel necessities, a cell phone holder attached to the comfort shoulder strap and a comfort grip handle.

www.stahlsac.com





Halcyon goes PINK

Beyond the realm of technical diving, the Infinity BC System has found favor among recreational divers worldwide. At the same time, Halcyon continues to lead the way with its revolutionary and very streamlined evolve double tank BC systems. Once again, Halcyon has decided to go bold for 2011 with this Special Edition H2:SPEC Pink system to stand out farther from the crowd than ever before. As with all Halcyon special editions, HPink is sure to get the attention. HPink Systems include the single-tank Infinity BC System and the double-tank Evolve BC System. Halcyon will donate a portion of the proceeds from each Halcyon HPink system sale to the Susan G. Komen Foundation in support of breast cancer research (www.komen.org). www.halcyon.net

5000 lumen

WiseDive torches are made specifically for divers (submersible to 500 feet/150 meters) but is equally suited for use on land, thanks to the RamFlow cooling system, which works with both water and air as a cooling fluid. So, this torch is ideal not only for diving but also all kinds of outdoor work, sports and activities. According to the manufacturer's data sheet, they deliver up to 32 hours of continuous operation on a single charge, though the dura-



tion at full power (output is 5000lumen) is rated at three hours—which is still impressive. And you can forget about replacement bulbs and batteries. The WiseDive light requires zero maintenance; 50,000+ hours of LED, the batteries deliver up to 500 recharges. After 300 recharges, the battery capacity will be decreased by 20 percent. All products from WiseDive with a two-year warranty (with limited guarantee for the batteries). www.wisedive.com

Poseidon USA

Poseidon Diving Systems, creator of the world's first recreation rebreather technology, has introduced a new headquarters in the US intended to service North American diving needs. This full-service facility will provide custom-

ers with Poseidon scuba products, as well as technical service for Poseidon gear and educational training.

Sweden Headquarters has designated Melanie Price, from Kickady Scuba, to be the Director of Operations, and Jerry Price to be Director of Service and Training at

the new facility to provide faster, more efficient customer service to North American dealers and divers. The new facility holds a fully stocked warehouse containing only top of the line Poseidon technology, an oxygen clean room for servicing Poseidon products, and a classroom used for training instructors and divers

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Grenada

Text by Kelly LaClaire
Photos and captions by Kate Clark

— *Spicy Diving on the Spice Isle*





Grenada's countryside (above). PREVIOUS PAGE: Seated atop the *Shakem* wreck lays an old crane adorned with red coral fans

The island of Grenada is affectionately known as the Spice Isle for its exotic spices of nutmeg, clove and cinnamon. Indeed, as we stepped off the plane, its warm, fragrant breezes welcomed us. Just a few hours earlier we were shivering in the drizzle and cold, wrapped in several layers of clothing dreaming of this exact moment. Kate, my cousin and photographer on this trip, laughed, “Oh my gosh, I think I’ll tear up my return ticket and violate my visa. I’m not leaving!”

The King Elvis taxi service took us the short drive to True Blue Bay Resort, a family-owned tropical haven perched above a small, lush inlet on the Atlantic side of the island. This would be our home for the next few days while we explored the island, reefs and, of course, the wrecks of Grenada.

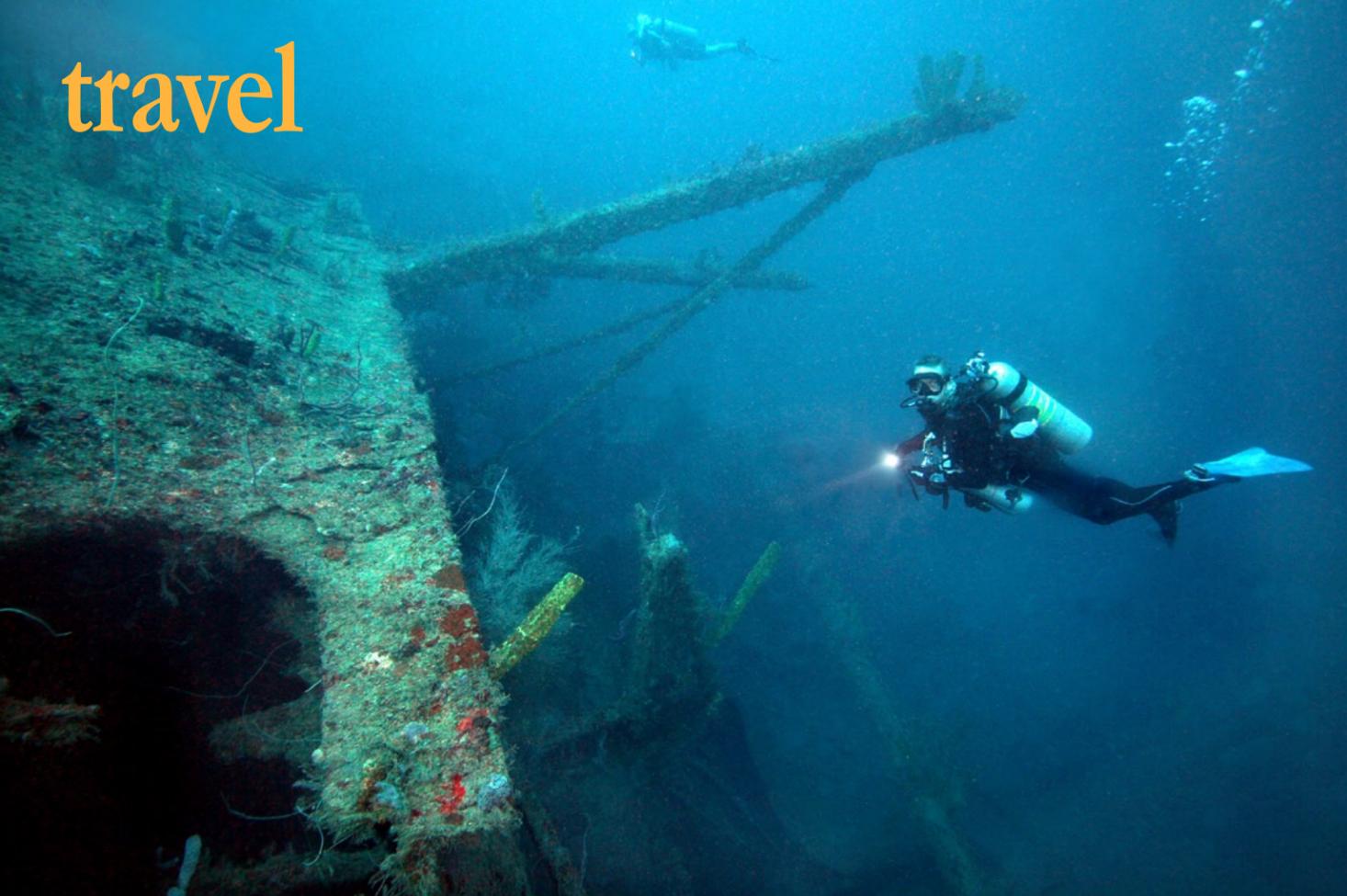
Binca, the hotel's concierge, had everything prepared and our rooms were gorgeous. Set just above the resort's white sand pool, our spacious suite came replete with a full kitchen, private balcony, large flat screen and fresh flowers. We made ourselves comfortable and headed down through the palms and manicured lawns to the dive shop.

Our hosts, Peter and Gerlinde Seupel—owners of Aquanauts Grenada—greeted us as their crew took our gear and readied the boat. We talked briefly on the deck over-

looking the bay, getting a short briefing on our upcoming dives. The more they described our schedule, the more excited Kate and I got. I heard a motor turn over and Peter smiled, “Ok, go get wet!”



Seemingly glowing in the blue waters, the azure vase sponge (above) is one of the most brilliant in the reefs of Grenada; Freshly harvested nutmeg with red outer venous portion, often used in pharmaceuticals (left)



Owner and operator of Aquanauts Grenada, Peter Seupel, shines his light on the side of the largest wreck in the Caribbean, the *Bianca C*

everything was all right.

His briefing on the boat a few minutes before gave me an idea of what to expect once we reached the largest shipwreck in the Caribbean, but when I first saw her misty outline, growing more definite and vast with each meter we dropped, I skipped a few breaths—breaking PADI's golden rule.

Just below us Kate turned on her back and spreads her arms as wide as they would go. She was smiling behind her regulator, and I knew what she was thinking

—*This thing is HUGE!*

This year marks the 50th anniversary of the sinking of the *Bianca-C*, an Italian cruise liner that caught fire from an engine room explosion while she rested in the harbor of Grenada's capital city, St. George. The ship burned for nearly three days but, fortunately, due to the heroic efforts of her crew, numerous local fisherman and selfless townsfolk, only two people perished and over 670 passengers were saved.

Hearing the distress calls, a British warship, *Londonderry*, arrived to offer assistance. They were able to sever the anchor chain and secure a tow line, removing her from shipping lanes and local boat traffic with the intent of beaching her in a safer location. Damage to the cruise liner's rudder made the tow difficult, and after a squall arose, the job became impossible. The line was severed, and the *Bianca-C* sank, coming to rest on her keel at a depth of 55 meters (165 ft).

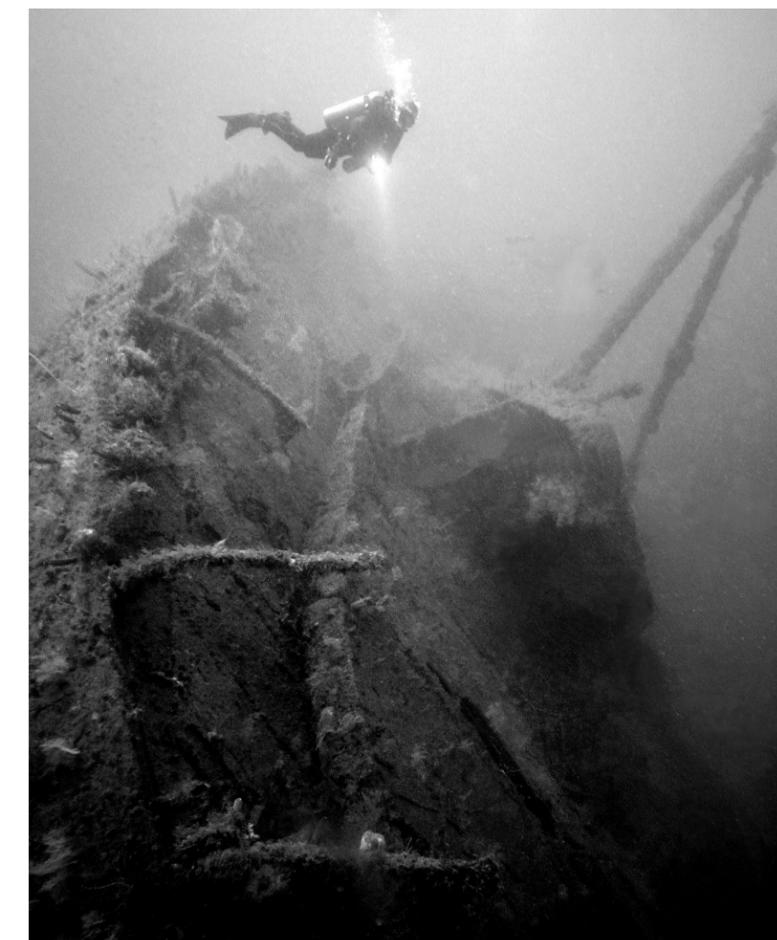
Italian Titanic

Our dive boat, *Salsa*, bobbed up and down in the turquoise swells just off the white sands of Pink Gin Beach at the southern tip of Grenada. I was the last of the group to take a giant stride off the stern and begin my descent into the empty blue below.

It was the first dive of our trip and as I floated down, fingers looped around the reference line already set by the dive team, I checked my gauges and computer knowing that at 20 meters (60 ft) the mythical *Bianca-C* would start to appear from the depths.

The water was 80°F (27°C)—both exhilarating and soothing at once—and a welcome change from the frigid temperatures of Puget Sound where I do most of my diving back home in the Pacific Northwest.

Paul Ward, instructor with Aquanauts Grenada, stayed close, flashing me the "OK?" sign, making sure I was equalizing properly and

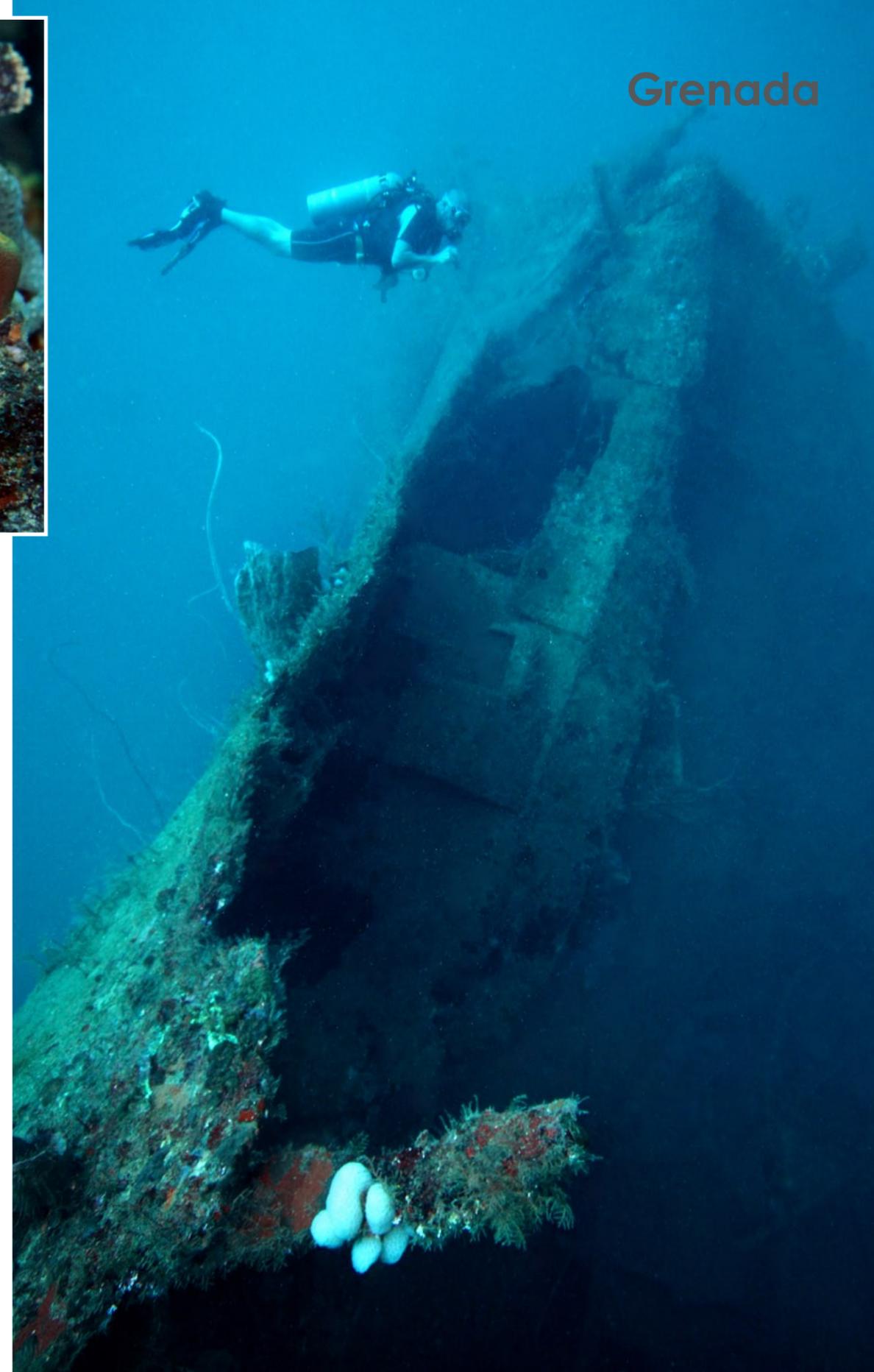


Looming huge in the blue waters, the *Bianca C* (above) dwarfs divers Peter Seupel and Kelly LaClaire with her massive 200-meter long body; Diver explores the bow of the *Bianca* (left)





Seupel (left) swims by a few smaller masts on the stern of the *Bianca C*; Master of disguise, a scorpionfish (above) lies motionless among some coral on a reef just beyond the *Bianca C*



We slowed our descent as the famous swimming pool on the deck of the ship came into view, and we leveled off just above the rear quarter. I looked around the impressive ship for a few seconds to get my bearings.

Kate was right, the *Bianca* was massive—roughly 200 meters (600 ft) long—and I realized one visit wasn't going to let us explore the wreck fully. I let go of the dive

this site) this was my first wreck dive past 33 meters (100 ft), and I admit I was a bit overwhelmed by the sheer size and scope of the twisted and listing goliath. My inexperience became all too obvious when, after only a few seconds of wide-eyed gawking, I heard Paul clinking a metal carabiner on his tank to get my attention. He motioned for me to ascend a bit. I was shocked when I looked at my depth

line and a mild current swept us gently towards the bow.

Large black tree corals rooted along the hull swayed back and forth amidst multi-colored whip corals, and a group of curious but cautious jacks came to investigate our bubbles.

Even though I am an advanced card holder (recommended for

gauge reading 44m (132 ft) and realized that I was so enthralled with my surroundings, I'd completely forgotten the depth warnings he'd given us topside.

The visibility is deceptively good here—33 meters (100 ft) plus—so it's imperative you keep a close eye on your computer. If you're not careful, you'll find yourself in a deco situation before you know it.

I finned slowly up a few meters, drifting past giant coral encrusted davits—cargo and life boat hoists—that curved like metallic alien claws over the ship's side and above the twisted and crumbling mid-section. The bow started to take shape below a school of fish so thick they looked like an underwater cloud swarming the foremast. For years the towering flagstaff remained vertical and reached proudly towards the surface, but just recently, it fell and now sits at a 30 degree angle toward the starboard rails.

I quickly scanned the foredeck for the nurse and reef sharks that like to congregate here, but I didn't see any. Instead, a giant barracuda nearly two meters long stared me down, brandishing his fangs. This was his territory, and he wasn't shy about letting me know it.

Paul tapped his tank and then his computer, indicating our bottom time for this

So large a wreck is she, exploring *Bianca C* takes a wide gaze. Nurse shark, barracuda, and spotted eagle rays can often be seen cruising by or finding shelter in her deep hull





The *Shakem*, originally a cargo vessel, now lies in 25 meters of water just off the Grenada coast. Her hull and frame teem with life as sergeant majors dart about the coral encrusted railings (above and left); A sharp zigzag in the walkway on the edge of the *Shakem* wreck (left) exists as evidence of the hard landing she experienced upon settling to the sea floor



depth was reaching its limit. We were diving air, so we only had a few minutes with the “Titanic of the Caribbean”. As we slowly ascended along a nearby reef, I looked back, and though it had only been a few moments, I already wanted to spend more time with the *Bianca-C*.

Shakem

While not as imposing and ominous as *Bianca*, the cargo vessel, *Shakem*, is a fantastic wreck for most any level of certification and should not be missed when diving the Spice Isle—provided your skills

aren't rusty and the currents mild.

Our first visit began with a rapid descent down to 20 meters (60 ft) to the uppermost deck. She's a large ship—60 meters (180 ft) of coral encrusted metal sitting perfectly straight on her keel. We descended a bit around the stern, scaring a few jacks and two large mackerel that bolted at the sound of our bubbles.

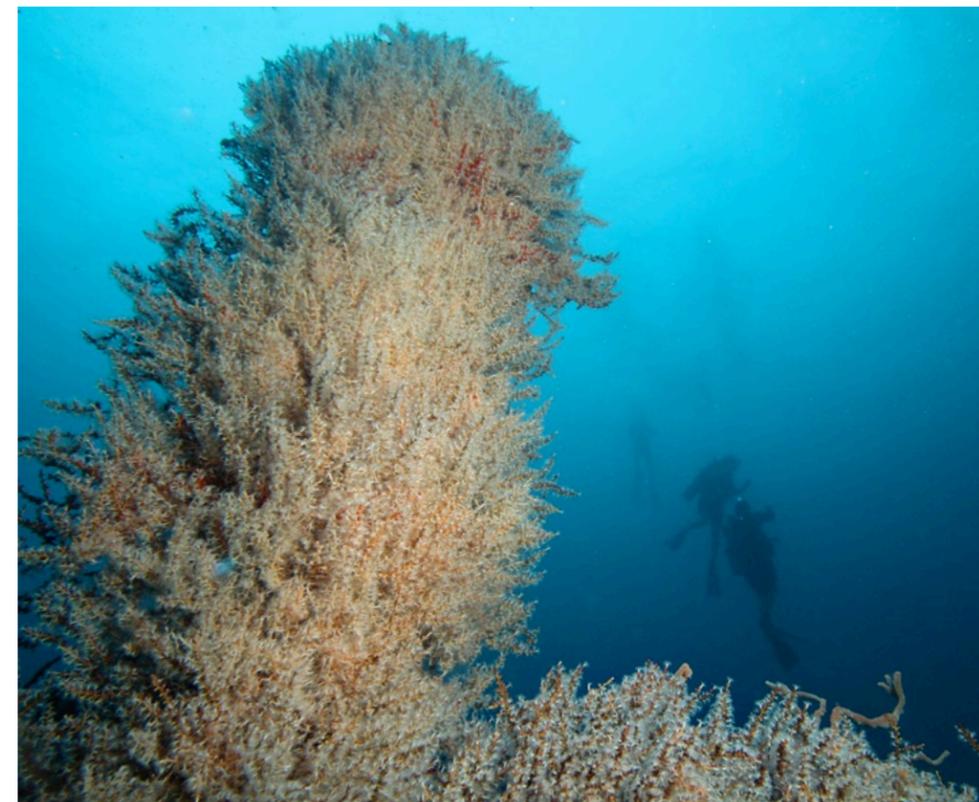
White ribbons of snowy telesto (soft coral) clung to the metal rails lining the bridge. We swam through the open promenade wrapping around the first two levels of the freighter. A school of

playful sergeant majors, striped and shifty, joined us as we glided over the large open hull, still fully loaded with enormous pallets of stacked concrete bags. This particular sight is one of the things that made this wreck so unique.

In 2001, a skeleton crew of four were bringing a load of concrete and baby diapers (yes, I said diapers—you can still see a few if you know where to look) to Grenada when the cargo, improperly loaded, shifted from the large swells near St. George. The ship began listing badly. She continued taking on water, and a final wave

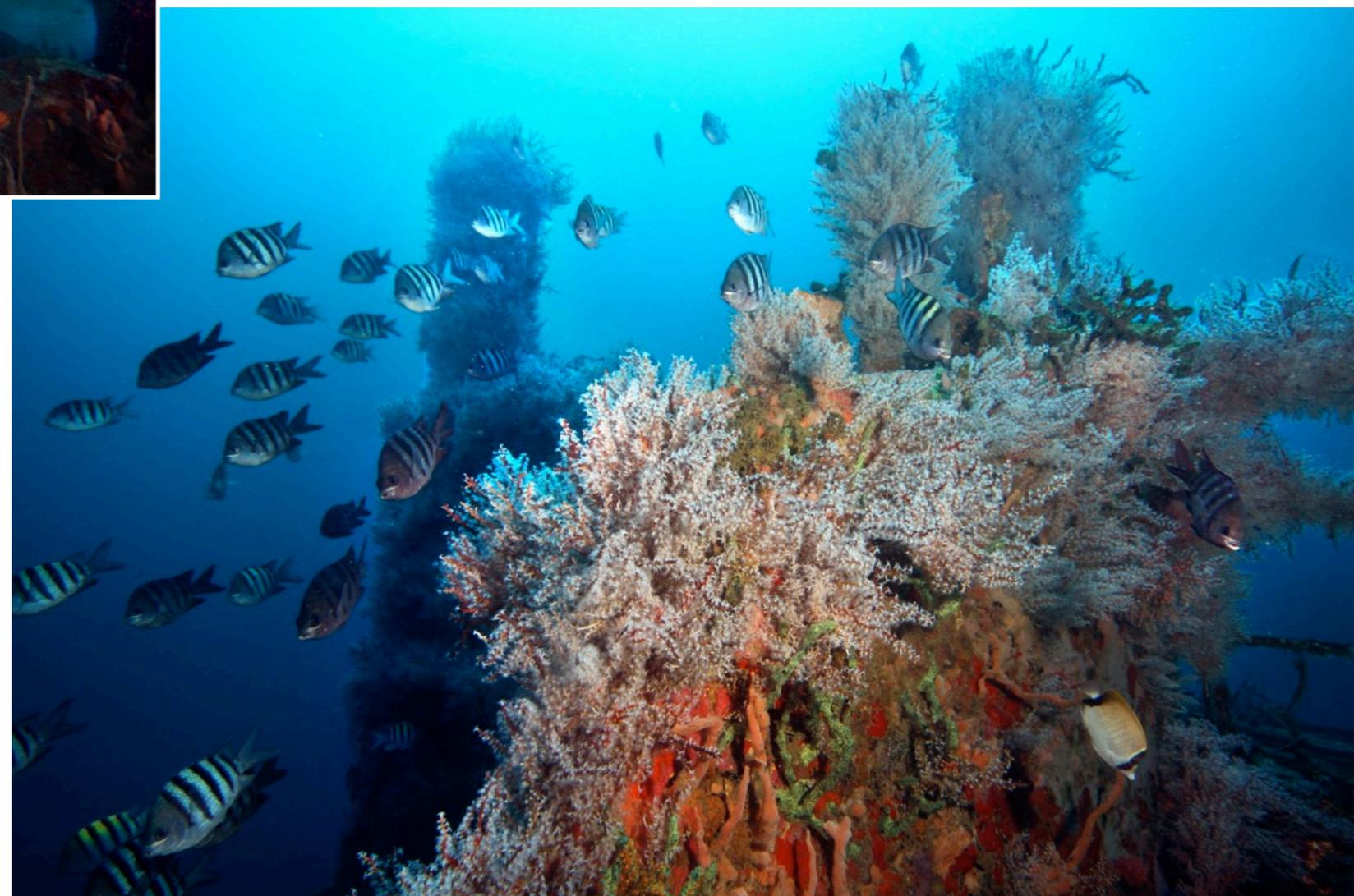


A large puffer fish on a reef near the *Shakem*



Grenada

CLOCKWISE FROM FAR LEFT: Sitting perfectly on its keel, divers can explore the prop of the *Shakem* wreck that sits still amidst wire and fan coral; The top of *Shakem's* mast, covered in telesto, frames divers rising up the ascent line after exploring the wreck; Sergeant majors fill the waters surrounding *Shakem* with movement as the bright coral offset the brilliant white and pink of the telesto, which cling to its frame



pitched her to the port side. The *Shakem* sank just off shore down to the coral beds 33 meters (100 ft) below.

Sponges and enormous black sea fans soon took root and now dominate the outer hull giving refuge to the ubiquitous squirrel, trumpet and parrot fish hiding in its nooks and crannies. Many divers report octopus and squid sightings here, but if they were around, they were staying well hidden.

Kate's camera strobes illuminated the enormous crane running the length of the cargo hold and the corals momentarily lit up in rich, vivid color. The sergeant majors moved in closer, swimming more frenetically than ever as we drifted toward the bow, still fitted with a good size hoist, its ropes twisting with

the current.

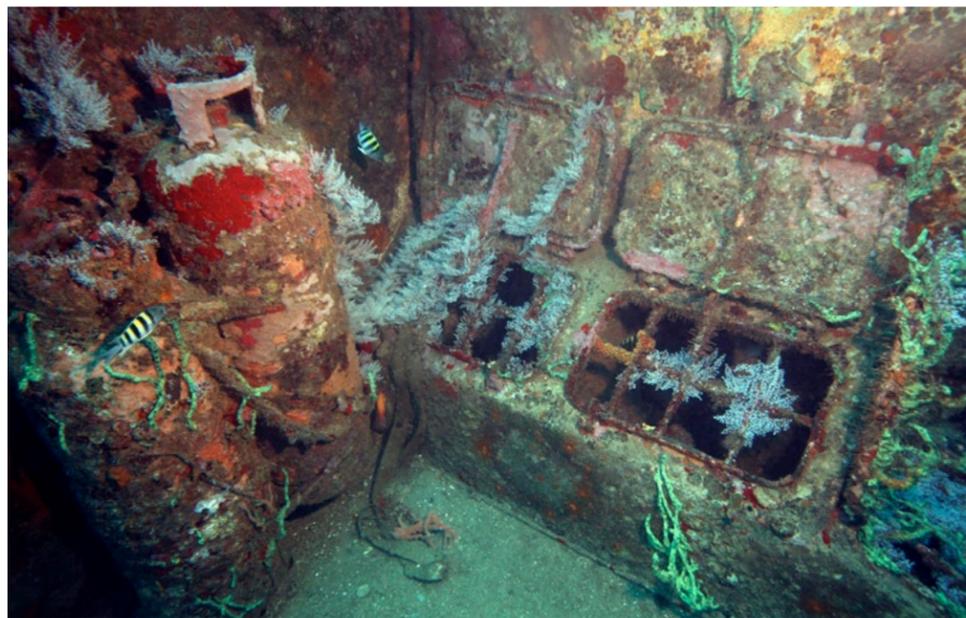
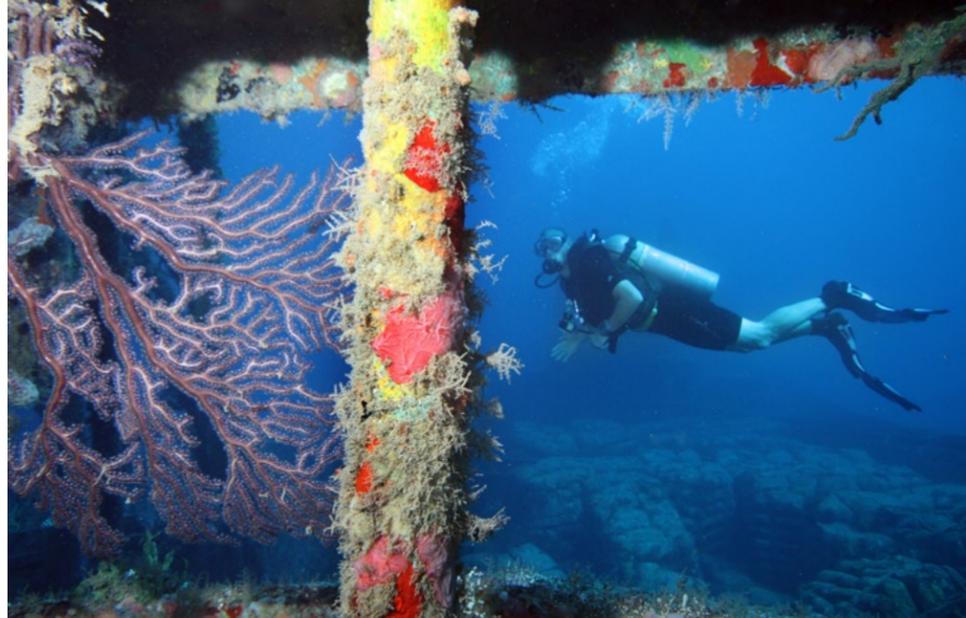
I frightened a large silver fish away from its nest on the bow and finally came to understand why the little striped school seemed so eager. Apparently, they've developed a unique behavior at this site—using people to hunt for food. As soon as a diver frightens away local fish guarding their nests, the sergeant majors swoop in, frantic and frenzied, eating every last egg they can get to before the larger fish returns, and then hurriedly catch up to the diver they have chosen, waiting for another opportunity.

They followed us over the starboard side as we swam back to take a look at the prop, relatively unharmed and surrounded by red and green wire corals. A large grey

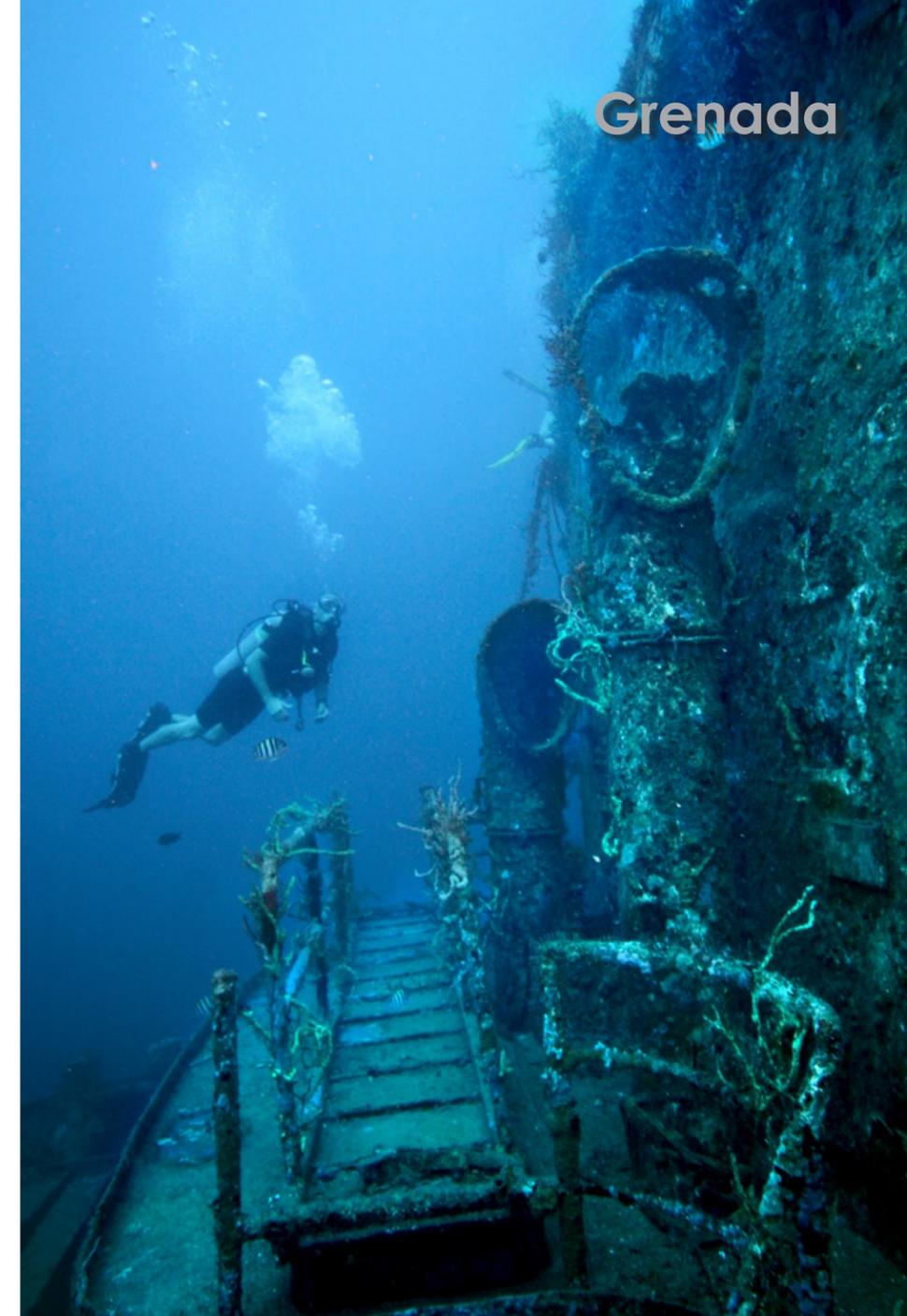
angelfish joined us, but after a moment seemed bored and disappeared into the labyrinth of fans and sponges below.

Again our computers started to squawk and I momentarily had an urge to ignore it. Twenty minutes just wasn't enough, and I wanted to stay a while longer. Kate, a PADI instructor, sensed my reluctance and raised her thumb towards the surface—more of a command than a suggestion. I shrugged in acquiescence and reluctantly drifted upward.

The sergeant majors stayed with us for several meters as we rose toward the surface, darting and slashing through our bubbles and then, realizing we were no longer of any use to them, started down and faded into the blue.



Divers (left) rise on ascent line behind *Shakem's* top deck railing covered in telesto; The concrete bags (top center) that led to the sinking of *Shakem* can still be seen from the numerous swim-throughs the wreck offers; Diver (right) explores the port side of the captain's tower; Tanks and barracks (above)



Nitrox

After the first two wrecks, sunning ourselves on the bow of the *Salsa* as we cruised back to True Blue Bay, I expressed to Paul my disappointment at the short length of time that we were able to explore each ship; I wanted more time to take in the scope and grandeur of them. In short, I was getting addicted to the thrill of seeing these coral covered iron giants, and I wanted to squeeze every ounce of bottom time I could out each dive.

nitrox certified," he said. "Diving on air is extremely limiting when visiting the wrecks in Grenada. With nitrox, you can stay down longer and take all the time you want. Plus, our nitrox mixes are included free in your dive packages, so you have no excuse."

If you're unfamiliar with nitrox, also called enriched air, it is a mixed diving gas that has a larger percentage of oxygen, making the chances of nitrogen narcosis fall markedly. Many divers say they think clearer at depths when diving with nitrox, and it allows one to stay

deeper far longer without the risks of nitrogen toxicity.

Twenty minutes later we had the manuals in our hands, and the next morning, instead of air tanks attached to our gear, two green and yellow banded cylinders stood ready for testing.

Paul went over the procedures and precautions before we headed out that morning. We were diving a downed catamaran called, *Rhum Runner*, followed by a reef drift to look for turtles, sharks and smaller critters hidden in the coral beds.

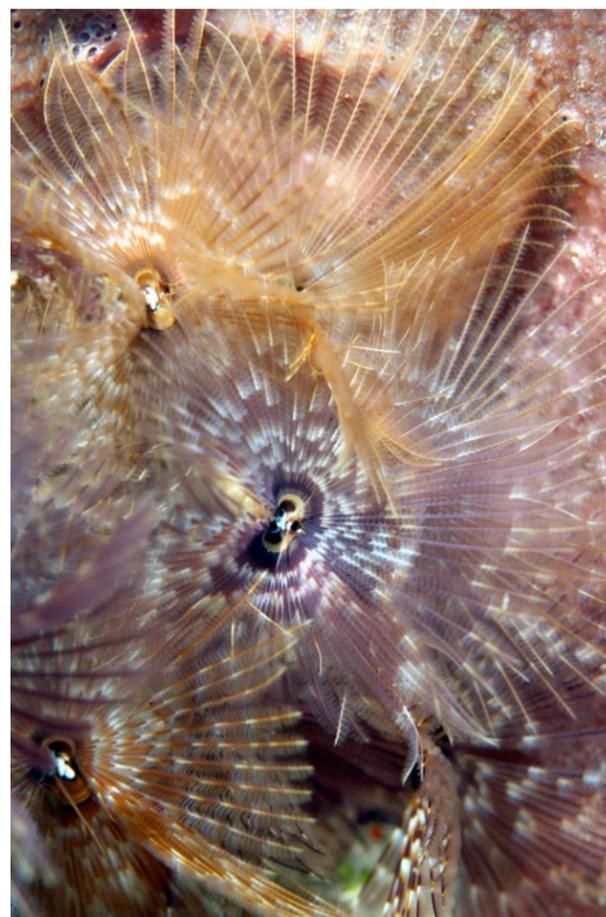
We reached the small wreck at right around 40 meters (120 ft), and I checked my computer. The bottom time read over 50 minutes, and I thought it was malfunctioning. Then I remembered the tank on my back was filled with enriched air, effectively giving me more time to remain safely at this depth than my tank would last. I got busy exploring the wreck, confident I'd have all the time I wanted.

A spotted eel was making his home among the red and purple corals taking hold along the ship's frame and a small

school of gray angelfish swam in lazy circles between the twin hulls. A swarm of blue chromis raced back and forth along the portside hull moving like a regimented flock of birds.

We circled the small wreck for more than ten minutes before moving on and, thanks to the nitrox, I didn't leave feeling cheated or hurried. We let the current sweep us up and over a nearby strip of reef where we found another spotted eel, this one over a meter in length (3 ft), protecting his turf by hissing at us. Kate pointed out two French angelfish, my





CLOCKWISE FROM FAR LEFT: Front rail of *Shaker* wreck covered with coral growth; Pair of four-eye butterfly fish; Curious and friendly spotted trunkfish swims among brightly patterned coral; Flamingo tongue snail; A long and cleverly disguised lizard fish disguises itself by lying incredibly still among the sand; Feather duster worms filter food from the sea



favorites, swimming close by. We followed them for a bit, mesmerized by their gleaming yellow spots and graceful profiles.

Nearby, a set of spiny lobsters were trying to hide beneath an outcropping of corals while a sour-looking scorpion fish eyed us suspiciously.

A metallic tink-tink-tink sounded, and we swam over to Paul and the rest of our group who were getting a look at a nurse shark

sleeping under a shelf of jagged coral. We had been under for nearly 60 minutes and my computer indicated I still had 40 minutes of remaining bottom time. I took another look at the shark, his beady white eyes almost glowing, and began my ascent.

As we surfaced, I wondered why I hadn't

taken the specialty enriched air class long ago and saved myself the headache I had on my previous dive at *Bianca*. I knew I was going to get another shot at her before we left, but at that moment I vowed I would write this recommendation for you, the reader: do yourself a favor—if you book



Mandoo, the most sought-after tour guide in all of Grenada, feeds a bite of banana to a Mono monkey perched on his shoulder



a myriad of adventures for anyone visiting.

One of our favorite activities was a full island tour with Mandoo, a local guide known as

book a tour or nature walk, visit www.grenada-tours.com or just type the name Mandoo into a Google search, and he'll pop right up.

Fish Friday – Lobster, Breadfruit and Carib

A few kilometers north of St. George lies the fishing village of Gouyave (pronounced, gwauv) where every Friday night a local food festival known as Fish Friday takes place. Here you will find two narrow streets lined with local vendors frying, boiling, stewing and Bar-B-Queing all kinds of seafood and native dishes. Kate and I splurged and each ordered a lobster tail brushed with lemon garlic butter with a side of fried breadfruit and hot sauce.

of Grenada.” There isn't anything about his homeland he doesn't know, and he is the perennial winner of Grenada's "Tour Guide of the Year" award. Plan on taking a whole day, as Mandoo takes you in his clean and comfortable—as well as air conditioned!—van through the back streets, hillsides and forgotten neighborhoods of the Spice Island.

You'll tour a rum distillery, walk the cocoa and fruit trees of an authentic working nutmeg plantation as well as eat at a beachside café, feed a monkey or two and learn the impressive and enthralling history of Grenada's rich and turbulent past. The tour is slow and easy, just like Mandoo, whose motto is: "We're on Island time here. If you're walking too fast my friends, you're breaking the law!"

Mandoo also gives personal tours if you would like a more private experience and is available for taxi service. He also offers hiking and trekking tours through the rain forests where waterfalls abound, and the wildlife is never dangerous. As Mandoo puts it, "The only thing risky in Grenada is the rum punch!"

After taking his tour, I honestly can't imagine trying to use anyone else for these services. To

a trip to Grenada, get a hold of Aquanauts and ask to take their nitrox certification straight away. You won't regret it.

Topside treats

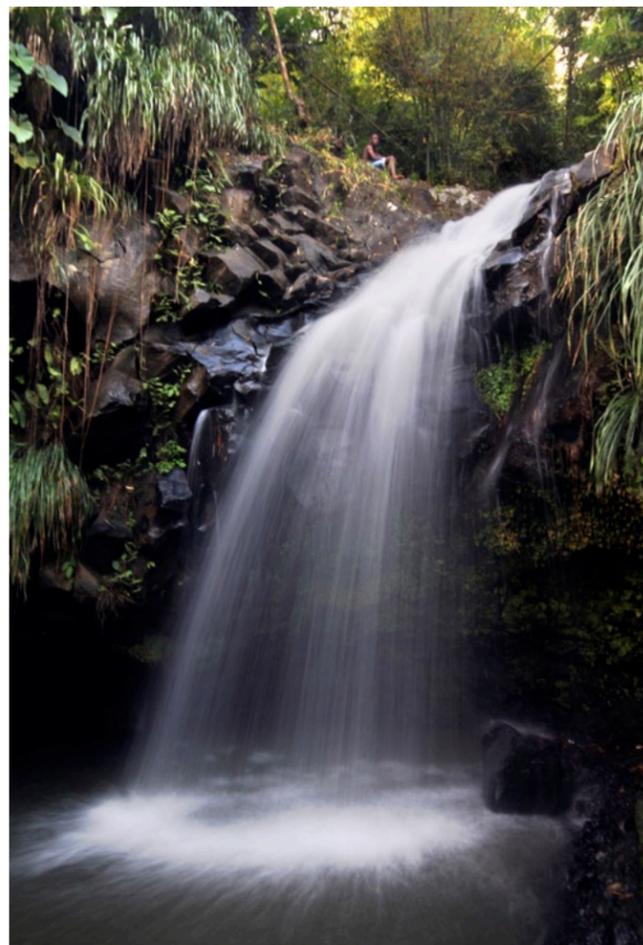
When visiting the Caribbean islands, you can't just dive all day and not explore the islands themselves. Well, okay, I suppose you could, but in Grenada that would be silly. There is far too much beauty and history to be found. We recommend the following excursions when you're not under the water.

Mandoo can do!

The island of Grenada is lush and fertile, offering a rich history and



THIS PAGE: Scenes from Fish Friday in Gouyave, including a delicious lobster and veggie dish (center); Grenada's famous rum (right); Festive drums (left); View of St. Georges (top center); Coconut seller in town (far right)



Every food tent had cold Carib on hand—Grenada's local brew—and observing Benjamin Franklin's sage pronouncement, "Beer is proof that God exists and wants us to be happy." We both drank several.

A few vendors were selling Lambie (conch meat) while all had various fried fish on the menu. Two or three stalls offered spices, jewelry and gifts for tourists. We stopped at one to try the homemade nutmeg ice cream.

On the night we attended, a local drumming group performed on benches along the road wearing Santa hats. It's a good time, and if you find yourself in the area, be sure to swing by and sample the dishes.

Hashing with the Harriers

— *A nice drinking club with a social problem*

Hashing is a British "sport" invented in the 1930s when a couple of bored expats in India needed to get outside but didn't know what to do. Of course, they went to the pub—where



CLOCKWISE FROM FAR LEFT: Peter Seupel, owner of Aquanauts Grenada, stands on his boat, *Salsa*, overlooking divers enjoying a pleasant surface interval while snorkeling a shallow reef; A picturesque waterfall streams into a placid pool in a mountain village in Grenada; Participants in Grenada's Hash group emerge from the wild and thick foliage that covers the hills of Grenada. Following a path marked only by piles of shredded paper, Hashers hike through varied terrains to get a unique feel for the wilds of Grenada; An antique, but

all great thinkers go—to come up with some ideas. Several pints and a few arguments later, the pastime known as hashing was born!

What is hashing you ask? Well...it's a bit difficult to explain. Think nature walks mixed with trekking, throw in a few piles of shredded paper, a

couple false trails and random shouts of "Are You?" followed by cold beer and fried fish. Confused? Yeah, so were we, but it's something you don't want to miss when you're in Grenada.

Peter and Gerlinde, owners of Aquanauts dive centers, are mem-

still utilized coco grinder awaits another batch of properly dried coco seeds that it will grind into a fine coco powder; Undersea murals decorate the walls of Aquanauts Dive Shop, which is welcoming and tidy with a professional staff ready to accommodate divers





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than ever, as over the last few dives she'd noticed that the headaches she normally got from diving deep had vanished and working the small buttons of her camera housing had been far easier on enriched air.

She mentioned this to Peter and his answer, like his nature, was direct and concise: "That's because of the added oxygen in your mix. Listen, everyone, and I mean everyone, who dives at 30 to 40 meters experiences some form of nitrogen narcosis. Whether they feel it or not, it's happening on some level. Obviously, you feel it more than others, but if you keep using nitrox, you won't have to continue to deal with those problems."

The boat ride was over before we knew it. Peter stepped off first, and I silently snickered at his old-school fins that looked like they were manufactured in the 60's.

We reached the *Bianca-C*, and the viz was outstanding—at least 40 meters (120 ft). I looked at my computer and was pleased to see we would have over 30 minutes to investigate.

A few giant barracuda aggressively showed us their teeth, as we started making our way forward. The current was mild, and I didn't feel hurried at all, taking time to study the enormous black and green fans making a coral forest on the outer hull. Purple wire coral spiraled out from the decks amidst great clusters of

bers of the Hash House Harriers and can help you set up a hash on your day off from diving. In fact, they will probably join in and run circles around you, as they are both in better shape than most!

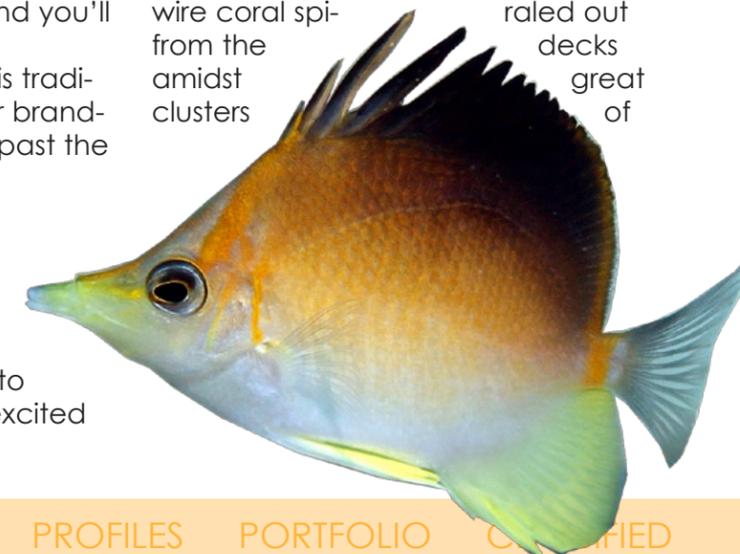
If you decide to go, and I HIGHLY recommend it, here is what you'll need: 1) clothes you don't mind getting dirty in and a good pair of running shoes—no flip-flops; 2) a towel; 3) a full change of clothes; 4) your sense of humor. Be sure to bring a few dollars for drinks and food after and don't forget to sign up with the mis-management when you get there.

All first timers get a signed certificate after the hash and a special gift from the Harriers. It's a riot, and you'll love it! We promise.

Oh, yes, one last thing... It is tradition that all newcomers wear brand-new, white socks that reach past the ankles, so bring those too.

Bianca-C —Take two

Peter, a diving virtuoso and technical master known as "The King of *Bianca C*" joined us on our second visit to the *Bianca*. Kate was more excited



CLOCKWISE: A majestic eagle ray glides over the *Bianca C*; Pulling up his reel attached to the safety buoy above, Peter Seupel in his cool fins finishes up the first dive of the day at *Bianca C* amidst a school of blue chromis; Longsnout butterflyfish (inset) *Prognathodes aculeatus*





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gliding down into the deep.

We lingered at the giant leaning mast where circling jacks and large masses of creole wrasse and yellowtail congregated. Coral, sponges and fans covered the long pole completely, leaving not an inch of bare metal.

Kate took a few more shots frightening a group of small silver fish that came to have a look at us and then signaled me to check my gauges. She knows I use far more air than she does and, as an instructor, she tends to mother me in the water. I was at 700 PSI, so Peter pointed his thumb to the waves above.

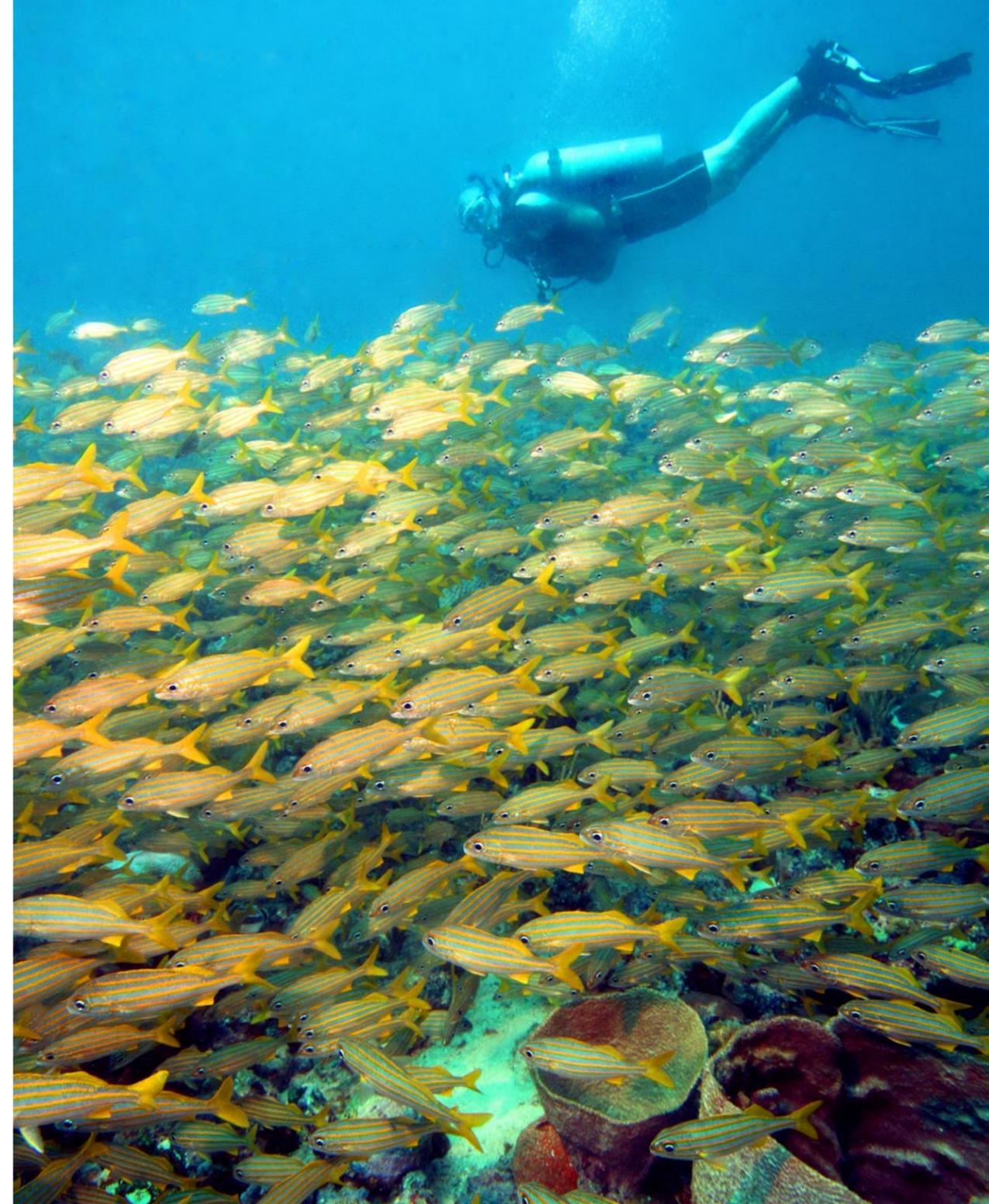
It had been a nice, slow dive, and after my second visit, I didn't feel cheated as I had before. But she's a big boat with lots of things left to discover, so I'm reserving the right to come back again. As they say, third time's a charm.

Shark Reef

One of the most memorable dives, as far as sea life was concerned, had to be our trip to Shark Reef. Only a few minutes boat ride from True Blue Bay hiding behind Glover's Island in the Atlantic, this reef is known for the sharks, stingrays and abundant species of fish that spend their time here.

It's a shallow dive, ranging from 15–25 meters, so any diver at any level of certification can get lots of time to search the coral and rock shelves for pelagics and smaller fish. We weren't in the water more than a minute before we spotted two or three stingrays hiding in the coral breaks. We moved closer for a better look and one of them became nervous, wriggling out of its sandy bed and gliding off toward more secluded waters.

Paul tapped his tank and pointed out a rare spotted drum feeding among some red sponges. He didn't see it yet, but just below him, under a coral shelf, lay a juvenile nurse shark trying to hide its wide



green head; apparently under the delusion that if it couldn't see us, we wouldn't see him.

We let the current take us, and I saw another rarity—two hawksbill turtles playing among a growth of sea fans and tube sponges. We gathered around them, but they seemed oblivious to us, too wrapped up in their little sparring match. A dozen or so black durgons swam by, and, as I do

every time I see them, I marveled at the way their upper and lower fins glowed with electric blue lines that move in peristaltic waves.

We came to a large section of massive coral mounds, and Kate sank down swiftly. She was taking pictures of a nurse shark, easily three meters (9ft) in length. It was sleeping, and we were able to get very close. Its skin looked like tri-colored

sponges and trees, which a school of yellowtails were using for shelter.

Peter pointed emphatically toward the bow, and I looked up to see an eagle ray flying in slow motion across the mid-section. Fluid and elegant, they are an absolute delight to swim with. Peter knew we might miss a great photo-op, as the ray moved into more blue water, and he took off after it. Suddenly my misgivings about his fins vanished, and I watched in disbelief as he out-swam the spotted ray and turned it back toward the bow. It made one more slow pass, indulging us, before

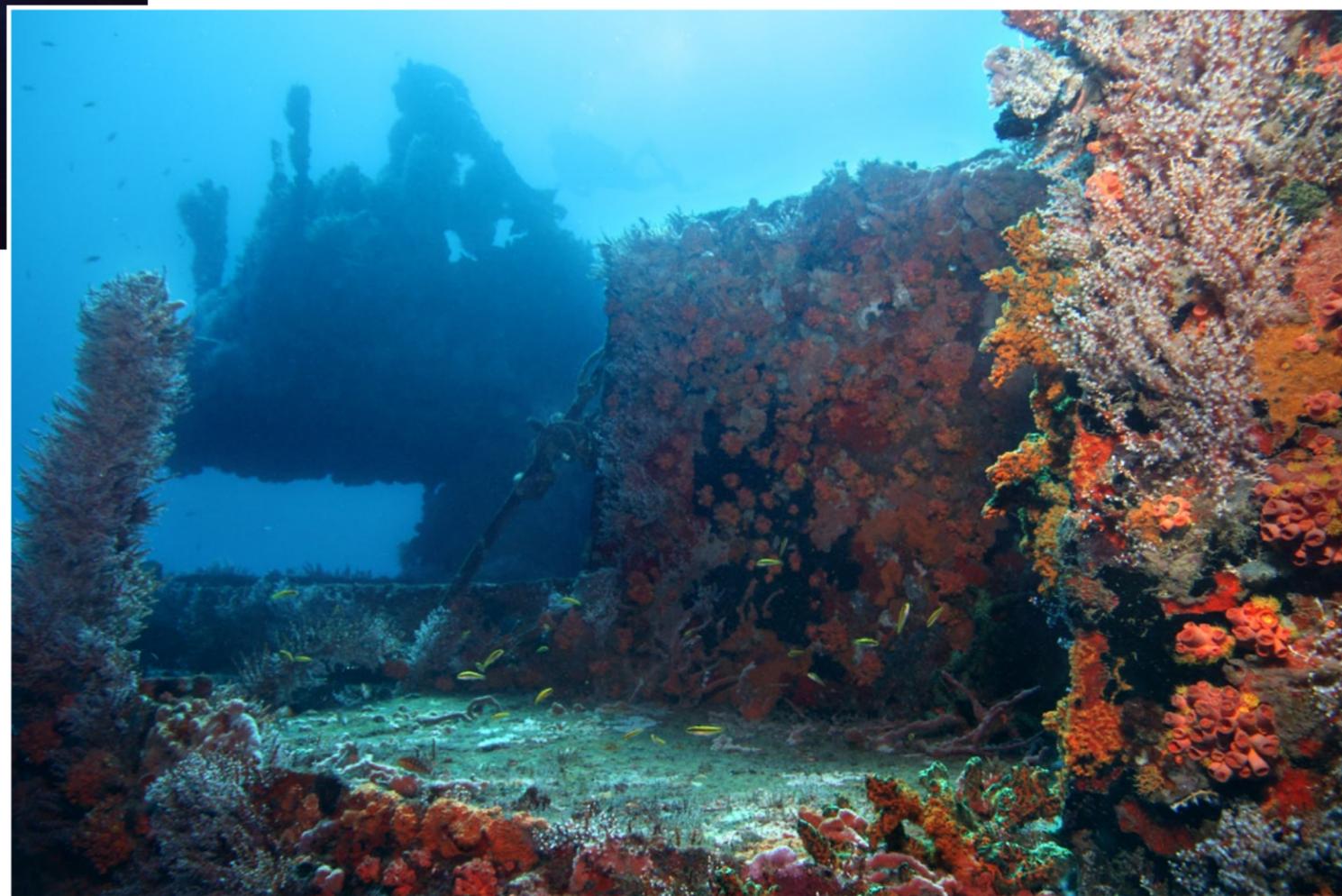


THIS PAGE: Scenes from Shark Reef. CLOCKWISE FROM ABOVE: Divers can get quite close to large nurse sharks sleeping in the coral farms; A hawksbill turtle glides slowly among the coral; Swarms of yellow French Grunt surround a diver; A stingray lies in wait buried in the sand



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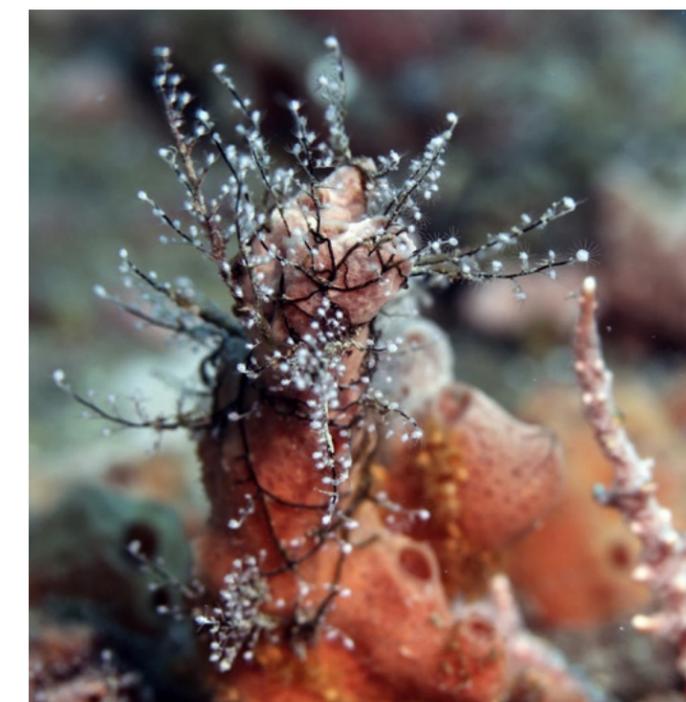
CLOCKWISE FROM LEFT: Diver in hull of the *Veronica*—a smaller wreck situated just over 20 meters deep, has a wide-open frame and is easy and safe to explore in and out of all her nooks. Divers can even find air pockets, trapped in her hull from when she went down; A goat fish swims in the coral reef near the wreck; A gorgeous queen angelfish is easily spotted due to its bright neon fin tips. This beauty was found swimming just under the *Veronica*; Side view of the wreck

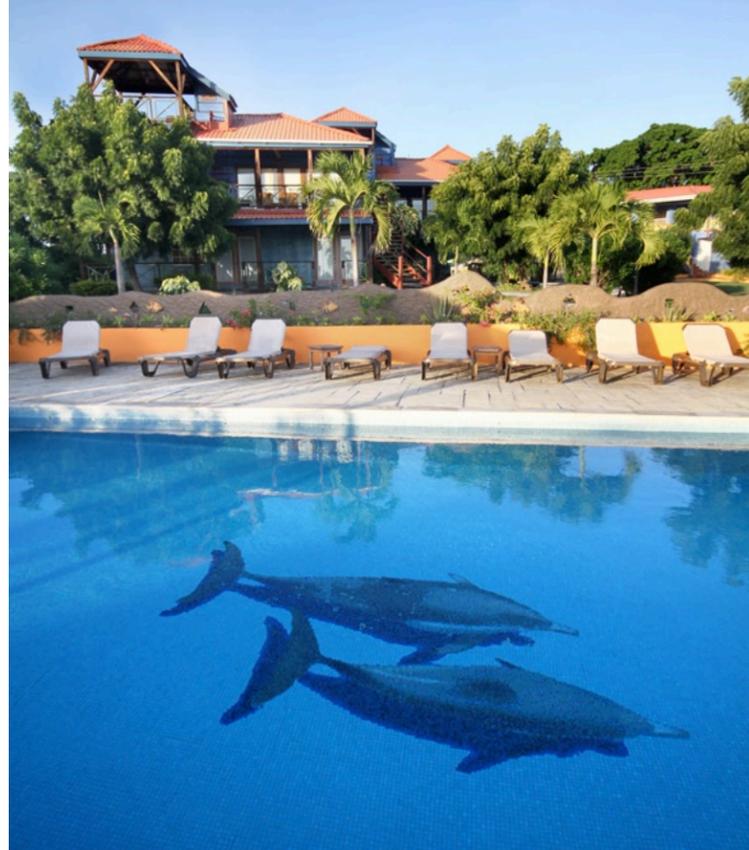


The *Veronica* wreck

If you have never been wreck diving before, the *Veronica* would be an easy and lovely introduction. Sitting in shallow, clear waters – her keel rests at around 16 meters (50 feet) – the small ship hosts numerous species of reef fish and has a wide open hull divers can enter with no danger. Large expanses of soft-pink cup coral, as well as brown and green sea fans, have rooted themselves along the outer skeleton providing shelter for large numbers of blue chromis and the creole wrasse are absolutely thick here. Surrounding the ship is a large coral bed that stays relatively shallow making a perfect environment for photography as the colors here absolutely sing and the mounds of diverse formations are filled with colorful critters and small fish. If possible try and dive this site twice—once with a macro lens and once with a wide angle. It is shallow enough that you can do this on one tank if necessary; just make sure you watch your air consumption carefully so you have ample time on both dives.

A macro image of telesto on *Veronica* shows the intricate detail of each single branch





CLOCKWISE FROM LEFT: Sunset is reflected in one of the two pools at the True Blue Bay Resort; Tiled dolphin motif decorates floor of pool in front of Indigo rooms; A sunset banquet at the Dodgy Dock restaurant; Diver and sleeping nurse shark in reef; Gerlinde and Peter Seupel (inset)

sandpaper, and the green flecks on its dorsal fin shimmered from the sunlight falling on its back. A black and white remora hovered near, obviously afraid of us but not wanting to leave the safety of the shark.

We backed off, and Kate took out her regulator, flashing me a big smile. It wasn't just the shark she was happy with. It was everything. Grenada is a magical place—a still unspoiled paradise of beauty, wonder and adventure for divers and non-divers alike. I feel lucky to have been able to share in all the island had to offer, and my sincerest wish is that you will give yourself the chance to experience it for yourself someday. You deserve it.

Born and raised in the mountains of Montana, Kelly LaClaire, is a dive writer based in Portland, Oregon, where his cousin, underwater photographer and PADI instructor, Kate Clark, also resides. The team covers dive sites in the Pacific Northwest as well as various destinations abroad. At just 22, the already accomplished Clark aims to travel the world teaching others the joys of the underwater world, while LaClaire's dream is to become less of an air hog. ■

AQUANAUTS GRENADA — *The Spice Island's Premier Dive Operator*

Ask most any diver who has spent time in the waters of Grenada what operator they prefer to dive with and the answer, most definitely, will be Aquanauts owned and run by Peter and Gerlinde Seupel. With three centers on the island and three well-equipped, beautiful boats, you won't find a more qualified outfit.

"I've dived dozens and dozens of times here. I've even worked for many of the shops around the island, and I always go with Aquanauts," said a British PADI instructor who was on vacation and happened to be diving with us. As we sat in the sun on a surface interval, she told me why. "Of all the places I have been out with, Peter runs the safest—and hands down—the best dive shop in Grenada. No one else even comes close."

I asked Peter about this when he joined us a day or two later, and he instantly became serious. "It's not just all about fun. Of course, we do everything we can to provide that for our guests—that's why we're here—to give people a great and enjoyable dive experience they won't forget, but safety has to be a dive shop's first concern. I don't care if you've got a

five star PADI rating; if you're putting you're guests' lives in the hands of an 18-year-old kid just because he's certified a few people... well, that's just crazy—and very dangerous. There's far more to scuba diving than how many certs your instructors give out. How much do they know about their boats, the swells, the currents? How much do they really know about their equipment and do they maintain it properly? How often do they inspect it and buy new gear? How well do they know rescue procedures, and how often do they practice them? This is what makes a quality dive shop—nothing else—and we work hard to make sure our team is well qualified in all those areas. We have to. That's the only way to ensure our guests will be happy and want to



return." After spending a week with them, I believe it. Aquanauts' boats are brilliantly clean and superbly maintained. Our gear (BCD's, computers, regulators, suits) worked perfectly and looked new. Before every dive, we were given exact briefings with exact plans and exact safety procedures. Each instructor and dive master carried backup pony tanks while also making sure we all were given our own inflatable safety tubes. We didn't have a single problem on any of our dives, and it became obvious that Aquanauts puts every effort into ensuring things stay that way. And as Peter pointed out, once we knew everything was well taken care of, we had a blast. ■



Cinnamon, nutmeg and cloves



Trumpetfish of many different colors can be seen almost everywhere in Grenadian waters, from right off the boat dock in the harbor to darting in and out of coral formations in the reefs

Grenada

will not give you one, or tell you they can't, then something is wrong! Usually this means they have oversold the flight (nearly all flights in December and February are oversold, so this is important). Even though you have paid for a ticket, if they do not give you a specific seat assignment, you will almost certainly be put on standby and may not be able to get a seat once at the airport. The airlines are often neglectful in explaining this so, again, demand a seat assignment or fly with another carrier

Use a travel agent. Sure you will have to pay a little extra for booking fees, but your agent will go to bat for you if any trouble occurs and, if needed, can do your re-booking faster and easier than you can when stuck at an airport due to weather delays, cancellations, missed connections or mechanical problems. Keep your agent's cell and office phone numbers with you in your carry-on so you can call them if you run into trouble. You paid for this service, so don't be afraid to use it.

Get travel insurance. Again, this will add a few dollars, but if you lose a day of travel, like we did, your insurance covers all expenses, meals, clothes and can even refund part or all of your flight costs. If you're working with a travel company, they can set this up for you.

Be sure to pack your carry-on with extras—two days of extra clothes, your toiletry bag, a swimsuit and any dive gear you deem essential like your computer, regulator, mask, shorty—things you don't want to borrow or rent from the dive center if you can help it—in case your checked luggage is lost. Nothing is worse than a couple days stranded in airports, waiting on planes and stuck in hotel rooms wearing the same underwear and socks. ■

Flight Tips

Many divers plan their trips in the winter months, specifically December, so they can leave the cold and dreary weather behind and do some warm water diving in a tropical paradise. This is also

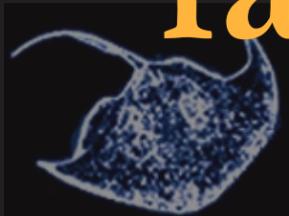
the busiest time of year for the airlines, and that means passengers are faced with possible delays, missed vacation days, lost baggage or equipment and extensive—hmm, how do I put this lightly—security probes and body searches.

Unfortunately, my photographer, Kate, and I had to endure all of the above on the trip to do this story. Here are a few tips to avoid the same holiday hassles when flying to Grenada:

Get a seat assignment right away. Whether you book the flight with an agent, online or over the phone, be sure to ask for a seat assignment for each leg of the flight you will be on—especially with American and Continental. If they

fact file

Grenada



SOURCE: CIA.GOV WORLD FACTBOOK

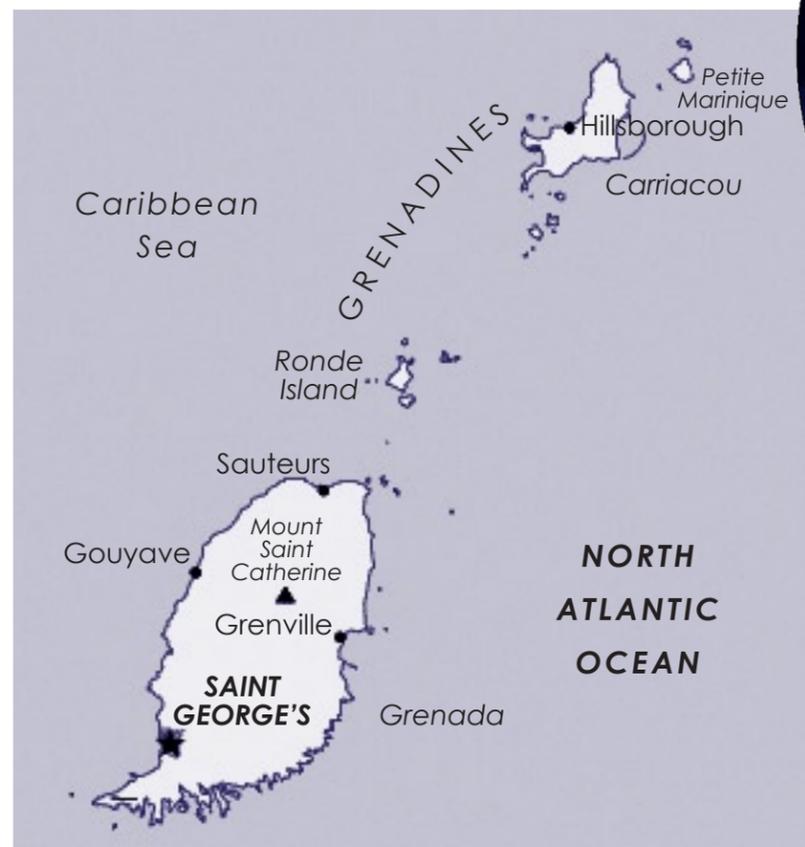
History Carib Indians first inhabited Grenada when Columbus "discovered" the island in 1498, but it remained uncolonized by Europeans for more than a century. The first attempt to do so was by the British in 1609, but they were routed out by the native population. In 1650, Frenchmen tricked the local chiefs into selling them a portion of the Island for next to nothing and over the next year constant skirmishes had decimated the Caribs. Over the next 90 years the British and French fought constantly for ultimate possession of the island and today there are still several forts dotting the landscape. At that time sugar and tobacco were Grenada's main exports but cocoa, coffee and cotton crops were soon being cultivated as well. In 1783 the Island was ceded to Britain who began bringing huge numbers of African slaves to extend their sugarcane production. The plantation system reigned until the emancipation in 1834. A few years later nutmeg was introduced to the island; a commodity nearly as precious as gold at the time due to its healing, preservative and flavoring qualities. The local soil proved so perfect for the spice that Grenada is now the world's second largest nutmeg producer. The island gained independence from Britain in 1974 but only five years later was taken over by a communist group that had financial and political ties with Cuba and the Soviet Union. The United States, Jamaica and several Eastern Caribbean states jointly responded with the now famous "rescue mission" and restored order. In 1984 a general election was held, reestablishing

a democratic government and ensuring free elections for the future. Capital: St. George

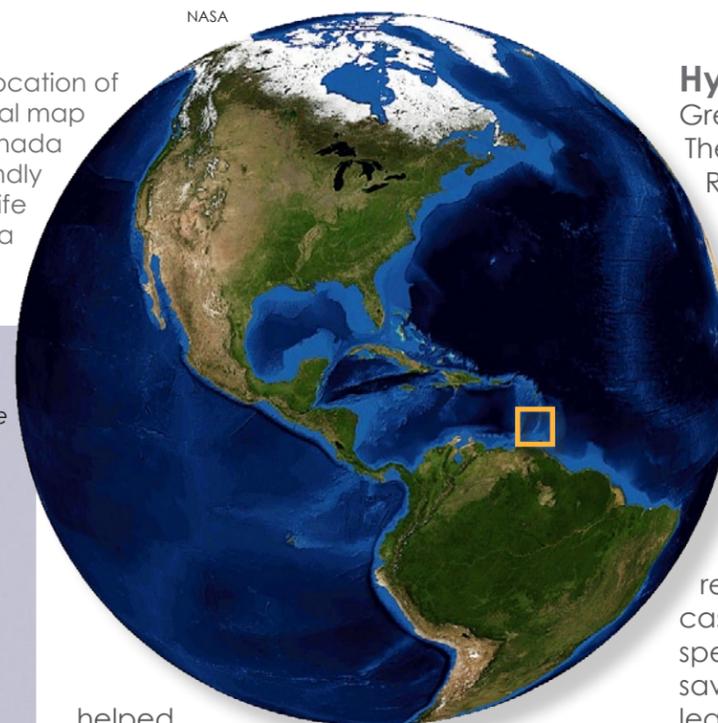
Geography

Grenada is located a few hundred miles north of Venezuela where the Caribbean Sea meets the Atlantic Ocean. The terrain is dominated by lush mountains densely covered in every conceivable variety of spices and fruit trees: nutmeg, cinnamon, cocoa, star fruit, orange, banana, breadfruit, mango, guava, clove, mango, cashew, almond, avocado, grapefruit, palm and bay trees. Coastline: 121 km of white sand beaches and small volcanic cliffs. Lowest point: Sea level. Highest point: Mt. Saint Catherine 840 meters (2520 ft).

Climate Of course, Grenada has a tropical climate with an average temperature in the low 80s F. The dry season runs from January to May and the rainy season from June to Dec. Natural hazards include hurricanes. Although Grenada lies on the edge of the hurricane belt and they occur less frequently than other Northern Caribbean islands, they do happen - witness Ivan in 2004 and Emily in 2005. The season lasts from June to November.



RIGHT: Location of Grenada on global map
BELOW: Map of Grenada
BOTTOM RIGHT: Friendly mono monkey in a wildlife reserve of Grenada



helped Grenada make a comeback but the world's economic problems over the last two years have stagnated that industry as well, making current growth difficult at best. Currently the unemployment rate is at 12.5% with 32% of its citizens struggling below the poverty line. One of the biggest challenges facing the agricultural economy is the strikingly few young adults working in that sector - 90% of all farmers are over 55 years of age and the number of young farmers has done nothing but decline over the last decade. Tourism, it seems, is Grenada's biggest hope for the future.

Currency East Caribbean Dollar (ECD). This currency is pegged to the U.S. dollar. USD1.00 = ECD2.70

Population 107,818 (July, 2010)
Ethnic groups: black 82%, mixed black and European 13%, European and East Indian 5%, and trace of Arawak/Carib Amerindian. Religions: Roman Catholic 53%, Anglican 13.8%, Protestant sects 33.2%. Internet Users: 24,000 as of 2008.

Language English is the official language but some locals also speak French patois (French mixed with local slang, abbreviations and accented colloquialisms). The literacy rate is 96%.

Environmental issues All of Grenada power comes from diesel burning generators and currently there is no recycling program in place. Hurricane Ivan wiped out 83% of all agricultural crops and the soil is still recovering. The nation is party to several international agreements: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Law of the Sea, Ozone Layer Protection, Whaling

Economy Grenada relies on tourism as its main source of income followed by agricultural products - namely: nutmeg, cocoa and other spices. Hurricane Ivan caused massive economic problems and, while the island is recovering, the country is saddled with large debts from its rebuilding efforts. Tourism growth has

Hyperbaric Chamber

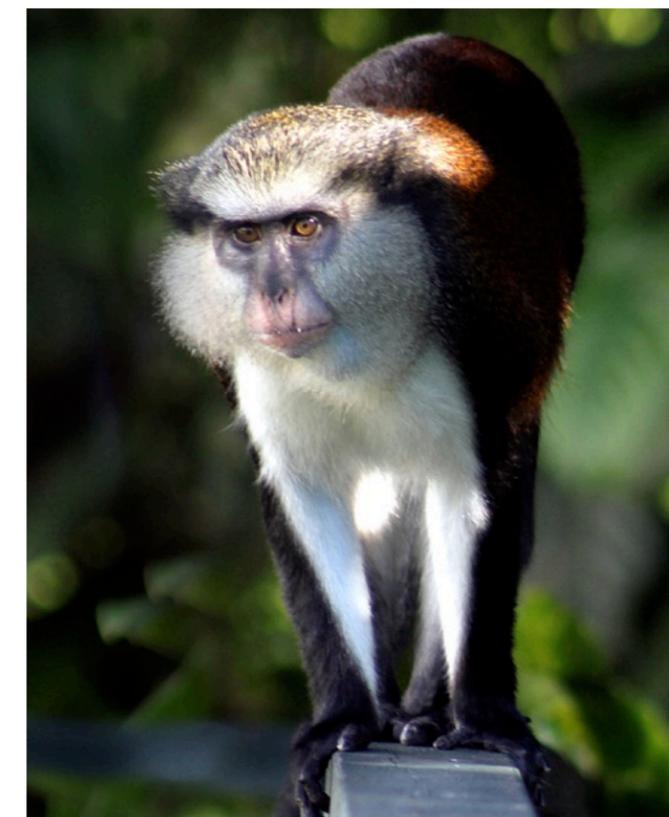
Grenada does not have a chamber. The closest facility is: Roxborough Hyperbolic Facility, TLH Building, Milford Rd. Scarborough, Tabago 868-709-5655 (phone)

Transportation

TO RENT OR NOT TO RENT? Unless you're from the United Kingdom or a Commonwealth nation and you're comfortable driving on the left side of the road, I strongly recommend that you DO NOT rent a car here. Just bring some extra cash and hire taxis. Chances are you'll spend less money this way, and you'll save yourself the headache of trying to learn how to drive on the other side of the road while simultaneously trying to figure out Grenada's confused, hurried and seemingly lawless traffic system. If you choose to rent a vehicle, e-mail me and tell me if you survived.

Websites

Grenada tourism
www.grenadagrenadines.com
Grenada hotel and tourism association:
www.gogrenada.gd ■





Text and photos by Scott Johnson

Humpbacks

— *The Tale of a Drive-by Fluking*



CLOCKWISE FROM ABOVE: Humpback calf watching its mom and their escort; Humpback calf at the surface; The massive fluke of an adult humpback. PREVIOUS PAGE: Humpback whale slowly swims by for a close look

Humpback whales (*Megaptera novaeangliae*) are intelligent, communicative, aerobic, social, curious, playful and sometimes devious mammals that can grow to 16 meters in length, weigh 41 tonnes (41,000 kg) and live over 50 years. The Dominican Republic's Silver Bank and Tonga are the prime destinations to snorkel with these magnificent creatures. North Atlantic humpbacks annually migrate thousands of kilometers south to the Silver Bank, a relatively shallow (less than

35 meters in depth), 500 square kilometer area located almost equal distance (105 kilometers) between Grand Turk, Turks and Caicos and the northern coast of the Dominican Republic. The whales may stay there from mid-December to mid-April to mate or have calves. The Dominican Republic wisely recognized the importance of this national treasure by establishing the Sanctuary for the Marine Mammals of the Dominican Republic via legislative acts in 1986 and 1996.



CLOCKWISE FROM ABOVE: Humpbacks regularly slap their flukes at the surface (called tail lobbing); Calves are often more inquisitive than their mothers or any accompanying male escort. Humpbacks breach more than any other species of whale

My visit to Silver Bank is aboard the *Turks and Caicos Aggressor II*, one of only three vessels with the necessary permit to enter the sanctuary. Amanda Bryan, the *Aggressor II*'s captain and my inflatable boat guide for the day, spots a mother and calf slowing swimming toward us.

Inflatable guides are invaluable in facilitating safe and successful encounters for both humans and whales. A guide looks for a whale or whales that might be receptive to the presence of snorkelers, positions the inflatable near the humpbacks projected path, then instructs the six to eight guests to slowly enter the water and wait for the whales to approach. Humpbacks dictate the proximately and dura-

tion of any encounter.

Amanda tells us to get ready as she moves the inflatable a little further from the whales. I am the last snorkeler to slip over the side. After retrieving and adjusting my camera system, I look back to Amanda to see if the whales are still headed our way. She smiles, nods in the affirmative and then quickly turns to her right and points excitedly. I do not see anything on the surface, so stick my head in the water to scan the area. In seconds, two adult humpbacks are almost upon me.

The largest whale is a 13-meter female and the second is her 10-meter male escort. She is obviously in the area looking for a mate, and he is trying to convince her of his prowess. The

male is more cautious and does not approach me, but the lady is a different story.

She makes a long, lazy circle around me at the surface and then submerges for a dive. As I watch her slowly swimming back up, I am in awe of her sheer size. The whale stops about five meters below me and then begins to turn this thrilling encounter into an episode of the Twilight Zone.

The female humpback turns upside down and stays that way as she resumes swimming in circles. She gets a little closer to me with each passing turn. Next, I hear high-pitched sounds emanating from her and see her belly ripple from one end to the other as if in sync with the sound vibrations. I have no clue what



Humpbacks



COUNTER-CLOCKWISE FROM LEFT: Humpback's bright white pectoral fins seem to glow in sunlight—pectoral fin slapping, like tail lobbing, is another attention-grabbing ploy of humpback whales; Humpback breathing at the surface; Breaching humpback at ploy

this means, but my toes are curling in my fins at the thought of capturing point blank images of this mesmerizing beauty.

When she is only 2.5 meters from the surface, she veers slightly to move directly underneath me. My eyes widen as I see her four-meter fluke (tail fin) behind bend sharply down and then quickly accelerate up towards me. The next thing I know is... impact.

The whale's fluke slams into my chest and simultaneously knocks \$15,000.00 worth of camera gear out of my hands, the air out of my lungs, all thoughts from my head and my body up and out of the water. I shake my head to clear it and breathe deeply as the world stops spinning. It

dawns on me that something is missing, so I look down to see my hands are no longer grasping the handles on the Aquatica camera housing. Instead, the slightly negatively buoyant housing and attached strobes are sinking.

I gulp a big breath of fresh air and dive. When I reach the housing, it is only a couple of meters from the mischievous whale's head. I warily grab the housing and kick to the surface. As my face feels air once again, I open my eyes to see Lauren, my dear wife, with a camera stuffed in her face. Either she thinks I am dead and is attempting to document the fluking for the life insurance company, or she knows I survived and thinks it is awesome that a 33-tonne (33,000 kg) whale just kicked my ass.





Humpback attempting to defeat gravity, yet again

As I pat my chest and abdomen to make sure I am indeed still in one piece, the female humpback returns to the surface upright and starts another game of ring around the human piñata. Still breathing hard, I keep my eyes on her and wonder what comes next. She is only a few meters away when she comes to a stop and rolls ever so slightly to her right. The whale looks at me, into me, with her large, twinkling left eye and in my mind, I hear her say, "Now you know your place in the scheme of things." Then, she slowly swims away. I feel both deeply honored by her attention and pretty ticked she did not stick around for a few parting pictures.

In retrospect, my humpback admirer or assailant (take your pick) clearly knew what she was doing. If she intended to harm me, she could have crushed my body almost effortlessly. I still have no idea why she singled me out. Maybe she saw a reflection off the

dome port of my housing. Maybe she had just left a wild whale party and was looking for some kinky action. I really do not know. Even so, I feel blessed to have been soundly fluked by a humpback whale because I now have one whale of a tale to share with others. ■



Lauren Johnson, Piers Van der Walt and a guest watching me get fluked

Scientists baffled by stunning accuracy of 10,000-mile migrations

Do humpback whales use the stars to navigate?

Traveling thousands of miles in an astonishingly straight line, humpback whales may be utilizing the sun, moon and stars for assistance.

Using satellite technology, scientists have tracked 16 tagged whales as they migrated thousands of kilometres northwards from the South Atlantic and South Pacific but have, until now, been baffled as to how they manage this feat with such uncanny accuracy.

Straight course

New research has revealed that the huge mammals may use a combination of the sun's position, Earth's magnetism and even star maps to guide their journeys, which can be up to 10,000 miles.

In a series of experiments conducted between 2003 and 2010, the majority of the tracked whales maintained a virtually arrow-straight course, never deviating more than five degrees from their migration courses despite the effects of weather and ocean currents. Writing in the Royal Society journal, *Biology Letters*, Travis Horton from the University of Canterbury stated: "They are orienting with something outside of themselves, not something internal."

Most long-distance travelling animals are believed to navigate using a compass based on either the Earth's magnetic field or the position of the sun. However, scientists have stated that neither method could account for the

extraordinary navigational ability of humpback whales, suspecting the mammals use a combination of all three. The Earth's magnetism varies too widely to explain the straight lines and solar navigation needs reference points not available in the water.

They wrote in their paper: "It seems unlikely that individual magnetic and solar orientation cues can, in isolation, explain the extreme navigational precision achieved by humpback whales. The relatively slow movements of humpback whales, combined with their clear ability to navigate with extreme precision over long distances, present outstanding opportunities to explore alternative mechanisms of migratory orientation based on empirical analysis of track data."

Humpbacks feed during the summer near polar oceans and migrate to warmer tropical oceans for the winter where they mate and calves are born. ■

It seems unlikely that individual magnetic and solar orientation cues can, in isolation, explain the extreme navigational precision achieved by humpback whales.

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cetaceans

Edited by Kelly LaClaire

Over the past decade, the number of white dolphins has continued to drop due to over fishing, pollution and loss of habitat resulting from previous land reclamation projects for industrial projects

Endangered dolphins collide with industrial growth in Taiwan

You may have heard of the Chinese white dolphin, especially due to recent environmental efforts to protect their dwindling numbers. But did you know that the island of Taiwan has its own sub-species of resident white dolphins? Did you know there are less than 100 left? Neither did I.

While looking over worldwide cetacean news, I happened upon a few small stories printed in a Taiwan newspaper following the chronicles of a genetically distinct population of critically endangered white dolphins, also called Sousa Chinese or Indo-Pacific humpbacks. According to reports, these incredibly rare dolphins live only in shallow waters three to five kilometers off the island's western shore and do not cross the Taiwan Strait to mate or feed with other white dolphins that reside near mainland China's rivers. Instead,

Removal of such shallow waters or intertidal waters reduces the size of their habitat

this isolated group lives in two "hot spots" of a relatively small section of Taiwan's coast and migrate back and forth in small pods throughout the year.

Chinese white dolphin What's at stake?

Directly in the center of this migration path lays the proposed sight of Kuokuang Petrochemical Technology Company's new oil refinery that would require reclaiming roughly 4,200 hectares

of coastal wetlands and is estimated to produce 12 million tons of carbon dioxide a year. "Removal of such shallow waters or intertidal waters reduces the size of their habitat," said Peter Ross, chairperson of an advisory committee working to protect the dolphins.

"The removal of wetlands can destroy fish habitats and thereby reduce food availability."

Ross and his team recently submitted a comprehensive report to the government detailing new surveys conducted in part by Taiwan University's Institute of Ecology and Evolutionary Biology. Their findings



TAKORADEE / GNUFDL / CREATIVE COMMONS

concluded that over the past decade the number of white dolphins has continued to drop due to over fishing, pollution and loss of habitat resulting from previous land reclamation projects for industrial projects. Exact numbers could not be obtained but estimates put the number of extant dolphins at only 60-90.

The paper went on to suggest that all areas of shallow waters used by the dolphins, including channels of migration need to be protected from industrial encroachment and large scale fishing or Taiwan could see that number drop fifty

percent by 2025. "For such a small, isolated and threatened population, priority habitat should not be limited to areas of particularly intensive dolphin use or high dolphin density."

The removal of wetlands can destroy fish habitats and thereby reduce food availability

Further exacerbating the problem is the small number of babies females have during their 30-40 year life span. White dolphins don't reach sexual maturity until around ten years of age and only deliver calves every three to four years.

What's the solution?

Ross's group and other conservationists are asking Taiwan to designate a sec-

tion of western coastal waters—including the two hot spots and the migration corridor between them—as "major wildlife habitat" under the Wildlife Conservation Act. According to the act, the original ecological functions of such habitats should be maintained, while construction and land use should be carried out in the manner that least affects the habitat.

Providing greater protection would not only benefit the environment but the commercial activities that depend on it in other ways, said Ross. "Many examples exist where marine protected areas actually lead to increased fisheries production because fish spawning habitats have been protected."

cetaceans



One group of local environmentalists, meanwhile, are moving ahead with their own conservation efforts. Last April, Tsai Chia-yang of the Taiwan Environmental Protection Union initiated a project to raise money for an environmental fund that intends to purchase the site that Kuokuang wants to reclaim land for development. The Republic of China currently holds the title to that area and is awaiting the results of an environmental impact survey before determining how it will be used.

Under Tsai's plan, individuals pledge to buy shares based on the cost of one square meter of land—NT\$119 (US\$3.84). That price is about 15 percent higher than what is being offered by Kuokuang Co.

The first phase of Tsai's plan was completed in June 2010, at which time 50,000 people had signed up to buy 200 hectares of coastal wetlands. The second phase of the campaign was

launched in September 2010 and is aimed at the eventual purchase of another 800 hectares. The first 200 hectares form a coastal strip along which the white dolphins live and the remaining 800 hectares are essential habitat for the fish the dolphins prey on, as well as for native bird species.

So far more than 6,000 people had registered to purchase shares in the second-phase of the conservation project, Tsai said. "We hope we can get a total of more than 200,000 participants by enlisting other environmental groups, academics and religious groups. Accumulating that number of supporters is a way to tell the government how many people are willing to protect the wetland."

If you would like more information about the conservation efforts or would like to contribute, please visit www.wildatheart.org.tw. ■

SOURCE: TAIPEI TIMES, TAIWAN REVIEW, BBC NEWS



Researchers discover whale's breeding grounds larger than expected

Scientists from the Hawaii Institute of Marine Biology and the National Oceanic and Atmospheric Administration have always known that the primary humpback breeding ground for the North Pacific was the main Hawaiian Islands.

However, with the aid of a network of underwater microphones known as ecological acoustic recorders (EARs), researchers from both groups have discovered these breeding grounds extend all the way throughout the Hawaiian Archipelago and into the Northwestern Hawaiian Islands, also known as the Leeward Islands.

Marc Lammers, a marine biologist at the University of Hawaii, said, "A mystery for whale researchers has been where the whales feeding in the summer in the Bering Sea and in the Aleutians off Alaska went in the winter to breed—many just

didn't show up in the known wintering grounds. This area in the northwestern Hawaiian Islands might very well be the missing wintering ground people are talking about."

These remote islands extend 1,000 miles northwest from Kauai and are seldom visited by people. Altogether, the area is part of Papahānaumokuākea Marine National Monument, one of the largest marine-protected areas in the world.

"These findings are exciting," continued Lammers. "They force us to re-evaluate what we know about humpback whale migration and the importance of the (Northwestern Hawaiian Islands) to the population."

The endangered humpback whale was once on the brink of extinction because of the whaling practices of the first half of the 20th century. Now, thanks to international protection, their numbers

have dramatically increased to about 20,000 whales with 8,500-10,000 of those visiting the Hawaiian waters for breeding purposes.

Scientists are now analyzing the characteristics of the recorded whale songs from the Leeward Islands to see if the humpbacks in this new area are an extension of the existing population—the ones known to breed around the main Hawaiian Islands—or a completely distinct group.

"Understanding if they're separate populations or not is very important, as right now regulatory agencies are discussing whether humpback whales should be delisted from the Endangered Species Act or not, and they want to get a good idea of all the stocks of whales out there for such a decision," Lammers said. ■ SOURCE: UNITED PRESS INTERNATIONAL



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World's only known hybrid wholphin gives birth

On December 23, Kekaimalu, the world's only known whale-dolphin mix, gave birth to a playful female calf at Sea Life Park Hawaii. The baby has yet to be named but is in perfect health and already the size of a one-year old bottlenose dolphin.

The young wholphin is one-fourth false killer whale and three-fourths Atlantic bottlenose dolphin. Her skin is an even mixture of a dolphin's light gray and the black coloring of a false killer whale. Trainers say she is very energetic and playful as well as being twice as large as her playmate—a "pure" baby dolphin who, along with her mother, share the mom-and-baby pool.

The calf is still dependent on her mother's milk, but has already been seen taking capelin from the hands of trainers and playing with the fish. All nursing takes place underwater, and typically continues until the calf is 12-18 months old.

About the whales

Kekaimalu, whose name means "from the peaceful ocean," is a 19-year-old wholphin—the result of a surprise coupling between a 14-foot, 2,000-pound false killer whale and a 6-foot, 400-pound dolphin. The whale and dolphin were living together in a shared tank at Sea Life Park when the mating, unseen by the trainers, took place. No one knew it had even happened until the hybrid species was born.

Although false killer whales and Atlantic bottlenose dolphins are different species, they are classified within the

same family by scientists. "In terms of taxonomy (the science of classifying animals by characteristics) they are not that far apart," said Louis Herman, a leading expert in the study of marine mammals. He also stated that there have been unconfirmed reports of wholphins in the wild.

Kekaimalu is a perfect mixture between the two species: she has the coloring of both parents, weighs 600 pounds, is ten feet long and has 66 teeth (false killers have 32-44 and bottlenose dolphins have 72-104). She is also very smart. John Oakley, a Sea Life Park trainer, has worked with the wholphin since she was young and commented, "She's one of the brightest animals I've ever worked with."

Kekaimalu's calf was sired by another Atlantic bottlenose from the park but until researchers do genetic testing they will not know exactly

which one.

"We are extremely excited about the birth of the baby wholphin. Mother and calf are doing very well," said Dr Renato Lenzi, general manager of Sea Life Park. "We are monitoring them very closely to ensure the best care for them."

The training and veterinary staff have spent long hours at the park over the first few months of the calf's life collecting a tremendous amount of data and ensuring that mom and calf were provided with the best care possible.

"Over the first 100 days of life of this calf, we had invested more than 2,400 hours of trainers and veterinary time to ensure the best care for mom and baby," Lenzi said.

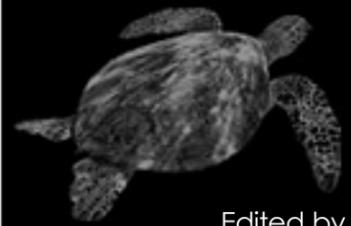
Sea Life Park officials said they hope to decide on a name for the baby wholphin soon and move her to a large display tank in a few months. ■ SOURCE: USA TODAY, CBS NEWS



MARK INTERRANTE / CREATIVE COMMONS

Wholphin, Kawili Kai, seen here at nine months old, was born at Sea Life Park in Hawaii. Her mother, Kekaimalu, is a wholphin and her father is a bottlenose dolphin

turtle tales



Edited by
Bonnie McKenna

The number of animals killed or sickened by the BP oil spill underestimated

According to the Center for Biological Diversity, an environmental group based in Arizona said in a study they recently released that they found five times as many sea turtles, ten times as many birds and 200 times more marine animals were injured or died as a result of the BP oil spill.

BP faces civil penalties based, in part, on the number of wildlife and fish killed or harmed by the spill.

The U.S. government's counts have not been updated this spring. The group added the numbers of birds, turtles and dolphin carcasses that are washing ashore to the official tallies. Those numbers have been multiplied by "accepted scientific multiplication factors" to reach the Center's "mortality counts".

By the Center's estimate, the spill caused harm or death to 6,165 turtles, 82,000 birds and as many as 25,900 marine mammals.

Tallies released by the United States in mid-February indicate 1,146 sea turtles, 9,209 birds and as many 128 dolphins and whales were harmed or killed as a result of the oil spill.

Scientists say that studies relying on multipliers for exact counts are impossible due to the number of carcasses that sink into the ocean, rot unseen in the marshes or are consumed after death by predators. ■

Leatherback nests increasing in Florida

There are 68 beaches in Florida that are known leatherback sea turtle nesting site. Although some beaches saw an increase in the number of nests as high as 16 percent, the average number of nests increased by 10.2 percent a year since 1979.

The Duke University Center for Marine Conservation said the news is very encouraging for the Atlantic leatherback populations.

The growth has been, in part, as a result of better monitoring and protection of the nesting beaches over the past 30 years. Surprisingly, nesting is increasing even



where beach protection is not enhanced. Climate change and the changing ocean may be altering the marine food web and creating a more favorable environment that favors the leatherbacks by reducing the number of predators and increasing the number of jellyfish.

Kelly Stewart, lead author of the study, said with plenty of jellyfish, breeding-age females may be able to build up fat reserves quickly and nest with more frequency.

Reduced populations of large predators such as sharks may be playing a role in the turtle boom by decreasing at-sea mortality for juvenile and young adult turtles.

Despite being a small population, scientists estimate fewer than 1,000 leatherbacks nest of Florida beaches.

The news for leatherback populations elsewhere is not encouraging. Populations in the eastern and western Pacific have plummeted to the point that species extinction may be imminent. ■

150 turtles trapped in net, die

Approximately 150 Olive Ridley turtles were trapped in a single net and found dead on Kothapeta Beach in Bangalore, India. The village leader said he never saw so many dead turtles in his life and blamed fishermen for not taking preventative measures. The founding chairman of Visakha, the society for the prevention and care of animals, said the disaster took place because the trawlers did not use the turtle excluding devices. ■



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Cities like San Francisco and countries like Italy and Australia as well as businesses like Target are banning the plastic bag. See video >>>



Our plastic food chain — or the turtle that pooped plastic

In March, ocean pollution experts met in Hawaii, among the discussions was a new report chronicling the effects of decades of plastic pollution, its effect on sea turtles and what we can do about it.

In 2009, marine biologists with Disney's Animal Programs discovered a green turtle that was having difficulty digesting food. Upon examination they found that a piece of plastic had lodged in the turtle's gastrointestinal tract. After removing the obstruction, the turtle defecated 74 foreign objects in the subsequent month. Among the items were four types of latex balloons, five different types of string, nine different types of soft plastic, four different types of hard plastic, a piece of carpet-like material and two tar balls.

The list of items from this one turtle read like a

catalogue of a growing concern for virtually all marine animals. Single-use-plastics are having a lethal effect on animals living in the sea.

At the meeting scientists laid out the entire disturbing history of plastics in the ocean, from the first reports in 1972 to the latest surveys of today. The report was grim, but it provided a ray of hope in the form of proactive ways that should be undertaken to curtail the overproduction and careless discard of single-use plastics.

While the scientists acknowledge that certain plastics have done good in the world, they lay the blame at the feet of the so-called "disposable" plastics: water bottles and caps, grocery bags, plastic utensils, etc—all intended for single use then thrown away. Although these plastics are cheap and convenient, they are durable and buoyant, leading to a potent and deadly combination in water.

Though plastics do break down from exposure to sunlight and other elements, the molecules of plastic never fully biodegrade, they just break into smaller pieces never to disappear. Many of these small pieces and particles eventually find their way into tributaries that feed into the oceans where plastics coalesce into the ocean currents. Here, they remain floating virtually forever and are often ingested by the creatures of the sea. Once in the guts, they can do harm or even kill, animals such as sea turtles.

The facts are: more than 1 billion single-use plastic bags are distributed free of charge—

daily. An estimated 0.2 to 0.3 percent make their way to the ocean. Even this small percentage means hundreds of millions of bags each year are floating in the sea.

This crisis has had a deleterious effect on sea turtles who mistake the plastic for jellyfish, their favorite food.

All seven species of sea turtles are listed as endangered on the World Conservation Union's "Red List" of species in danger of extinction. A situation made worse by the pollution of plastic in the oceans.

Worldwide, plastic pollution is adding to the stress on all endangered ocean wild life. Plastic can be ingested or ensnare sea turtles and can physical interfere with their

nesting activity on beaches where plastic pollution accumulates in large amounts.

Approximately half of all sea turtles surveyed had ingested plastic, and micro-plastics are accumulating in mollusks and crustaceans that turtles eat.

Corrective measures to ameliorate or end the plague of plastics in the oceans, according to scientists, are simple personal behaviors, including:

- Avoid plastic-bottled beverages
- Purchase products with minimal or reusable packing materials
- Buy in bulk to reduce the packaging
- Buy used items
- Use reusable shopping and produce bags
- For coffee and tea, bring your own mug
- For food, bring your own reusable container

After removing the obstruction, the turtle defecated 74 foreign objects in the subsequent month. Among the items were four types of latex balloons, five different types of string, nine different types of soft plastic, four different types of hard plastic, a piece of carpet-like material and two tar balls.



On August 2011, the whole globe becomes one huge underwater festival...

Text by Sharon Rainis



Epson Red Sea is known worldwide as the international underwater photography Olympics and has awarded photographers with prizes worth more than US\$450,000 during the past six years. Following the success of the competition, as well as the full HD underwater live broadcasts carried out at the recent Photokina Fair, producer David Pilosof has now decided to break all boundaries, introducing an international competition as never featured before.

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The eight-day World Shoot-Out will take place 1-8 August 2011, in any natural water resource found around the world, including seas, oceans, lakes, rivers, under the ice and more. Any photographer can take part in the competition by diving in a familiar or favourite destination during the days of the shoot-out.

This will be a wonderful opportunity for underwater photographers all around the world to either take a few days off for the sake of some diving in their local area, or to finally book the holiday they've been dreaming of in an exotic dive destination, on a live aboard or in a dive resort.

For more information, visit: www.eilatredsea.com ■



The Turtle Hospital sign (left)
Turtle ambulance (right)
The hospital (below)



The Turtle Hospital

Volkswagen repair shop in the country, so I decided to move down to the Keys full-time," said Moretti.

The motel, built in the 1940s, included a saltwater swimming pool. Moretti soon turned the swimming pool into a home for marine animals. The first

resident was a tarpon. Before long, he began adding more fish; a school of tarpon was followed by a snook, a sawfish, grouper, lobsters and eels.

The local schools learned of the pool's residents; they asked Moretti about bringing students for educational tours.

"The groups would come and we would put a conch or starfish in the kid's hands so they could see it was a living animal," he said.

In the mid-1980s, when the Teenage Mutant Ninja Turtles were popular Moretti decided to put a turtle in the pool. Moretti became

interested in sea turtles because he had seen many turtles crippled by fishing line, paralyzed by boat collisions, choked by rubbish and suffering with deadly growths. Fibropapillomas were covering the eyes, necks, flippers and the lungs of an estimated half of all the world's sea turtles. He decided, since he had success with other marine animals he could do something to aid these most ancient of creatures that is an endangered species.

The state objected, but Moretti continued to lobby for a turtle to include in the educational program. The state objected because there was no turtle rehabilitator in the Florida Keys.

Moretti then recruited Dr. Elliott Jacobson

from the University of Florida, who later became the Turtle Hospital's first veterinarian.

Today, The Turtle Hospital is the only facility of its kind in the world. Moretti and his staff treat injured sea turtles and, when possible, return them to the sea. If release is not feasible, the turtles become permanent residents.

Educational tours are offered four times daily to introduce visitors to the resident sea turtles and to the hospital's programs for loggerhead, green, hawksbill and Kemp's ridley turtles.

In addition to turtle rehabilitation and public education the hospital's goals include conducting and assisting in research that aids sea turtles world-wide.

Text and photos by Bonnie McKenna

Half way down the tiny islands that comprise the Florida Keys is the island of Marathon. There, located in a non-descript area on the main highway is The Turtle Hospital; the only state certified veterinary hospital in the world exclusively for sea turtles.

Behind the pale green façade of the two buildings that make up The Turtle Hospital is a story of determination and survival.

In 1980, Richie Moretti, decided that since he had "a very fast boat" he needed to go to the Keys to assist Cubans, fleeing to the United States, during the Mariel Boatlift. The following year, he returned to Marathon to fish.

Soon he found that he was making the trip to Marathon with more frequency so, he decided to purchase a small motel that was going into foreclosure.

"I realized the folks living in the motel were happier than I was operating the largest

THE FOUR MAIN GOALS
—of *The Turtle Hospital*

- Rehabilitate sick or injured sea turtles and return them to the wild.
- Educate the public through outreach programs.
- Conduct and assist with sea turtle research in conjunction with state universities.
- Work for environmental legislation to make the beaches and water safe and clean for sea turtles. ■



turtle tales



CLOCKWISE FROM LEFT: Richie Moretti; Florida sea turtles poster, Operating room; Recovery tanks and saltwater pool; Hawksbill turtle in recovery



up-to-date equipment enabling veterinarians to perform a variety of surgeries. Most of the equipment has been donated, some by local hospitals, doctors and environmental organizations.

A range of turtle ailments that are treated at The Turtle Hospital include flipper amputations, shell damage repair and the removal of intestinal impactations caused by the ingestion of foreign materials. The most common surgery performed is the removal of debilitating viral fibropapilloma tumors that affect more than 50 percent of the sea turtles in the Keys and around the world.

The Turtle Hospital and the University of Florida are doing cooperative research into the causes of fibropapilloma. It is currently the only known disease affecting wild animals on a global basis. The virus is infectious and is successfully transmitted among sea turtles.

"This is what it takes to kill a turtle," says Moretti as he opens



a box and dumps out, on to a table, an eraser, a chocolate wrapper, the insole of a shoe, a pen cap, several sizes and lengths of blue and green twine and rope, a green clothes pin, a crab claw, several pieces of plastic and rubber, a metal grommet and a bag of "Australian milled rice."

and that is what killed the turtle. All the rest of the stuff was behind it." Since its founding the hospital has successfully treated and released more than 1100 sea turtles.

For more information on The Turtle Hospital, go to www.turtlehospital.org. ■



"You could see the turtle liked things that are blue and green," said Moretti. "This rice bag was wrapped around the grommet

THREATS TO SEA TURTLE SURVIVAL

- **Monofilament entanglement** — Carelessly discarded fishing line can entangle the turtle's flippers and cut off the blood supply. Turtles that ingest the fishing line may die from the hook and/or the line cutting through the intestines.
- **Rope and net entanglement** — If a turtle becomes entangled underwater and cannot reach the surface, it will drown. The rope and net entanglements also cause flipper injuries.
- **Boat hits** — The propeller can cause severe damage to the shell, head, flippers and internal organs.
- **Oil spills and tar** — Chemicals can harm sea turtles by getting into their eyes, mouth and lungs causing suffocation, drowning, toxicity and ultimately death.
- **Intestinal impactation** — Turtles ingest debris, such as cigarette filters (which look similar to shrimp) and plastic bags (which look like jellyfish); these items can impact the intestines causing death.
- **Coastal development** — Development along coastal areas can result in damage to nesting sites and cause disorientation from artificial lighting.
- **Fibropapilloma tumors** — These are soft tissue tumors caused by a herpes-like virus. Green turtles are especially vulnerable, but it has been documented in all species. Tumors may form on the soft tissue, the carapace and/or plastron, internally or on the eyes leaving the turtle blind. ■

"I look at every turtle as something special," Moretti said with a smile, "I love them all."

Moretti funds the hospital with grants, donations from the public and with profits from the motel, Hidden Harbor, which he leases to the hospital foundation for \$1 a year.

The Turtle Hospital (Hidden Harbor Marine Environmental Project, Inc) is a 501(c)(3) charitable corporation. The motel provides the space and buildings needed to house and care for the sick and injured sea turtles.

The hospital contains



Text and photos by Christian Skauge

Space Diving

—Preparing for a walk in outer space

THIS PAGE: At the Astronaut Center European Space Agency in Cologne, Germany, Christer Fuglesang and other European astronauts are practising spacewalk

The European Astronaut Centre (EAC) is located just beside the airport in Cologne. The center was founded in 1990 to train astronauts for ESA's manned space missions, in particular in connection with the European Columbus module, which is part of the International Space Station (ISS). Ahead of them, the next batch of trainee astronauts have a 16-month basic training program, and an integral part of this is to dive. Astronauts need to be under water to practice spacewalks, also known as Extra Vehicular Activities (EVA). Diver and underwater photographer, Christian Skauge, paid ESA's Neutral Buoyancy Facility a visit.



Space Diving

Inside ESA's large compound, there is a number of fitness facilities including a large, specially built pool measuring 22 x 17 meters. This is where EAC's Neutral Buoyancy Facility is based, and this is where the astronauts get their diving certificate. The plant is also used to practice space walks. At the bottom of the ten-meter-deep pool is a mock-up of the Columbus module and

an air lock from the Russian MIR space station—both built in a 1:1 scale. The temperature of the water is a pleasant 28°C (82°F).

"Astronauts usually practice in white overalls, full face mask, helmet and using surface-supplied air and communication," explained Uwe Köhler from the company Space Diving Training and Support Ltd., which is responsible for EAC's astronaut training.

The custom-built space suits are too expensive and complex to be used in the general training, and are only used for practising specific tasks to be performed in space. The suits are big and heavy, and preparing for a dive can take a long time. To achieve neutral buoyancy underwater, weights are attached on up to 18 different places on the suit, and the astronaut is constantly being followed by a team

of safety divers and specially-trained astronaut trainers in the water. Usually, the astronauts practice basic skills such as moving around in a three-dimensional and weightless environment, the use of safety lines and communication with the control room and other astronauts.

Important training

All astronauts have to go through the





THIS PAGE: To simulate work in space, astronauts practice maneuvering equipment and gear underwater

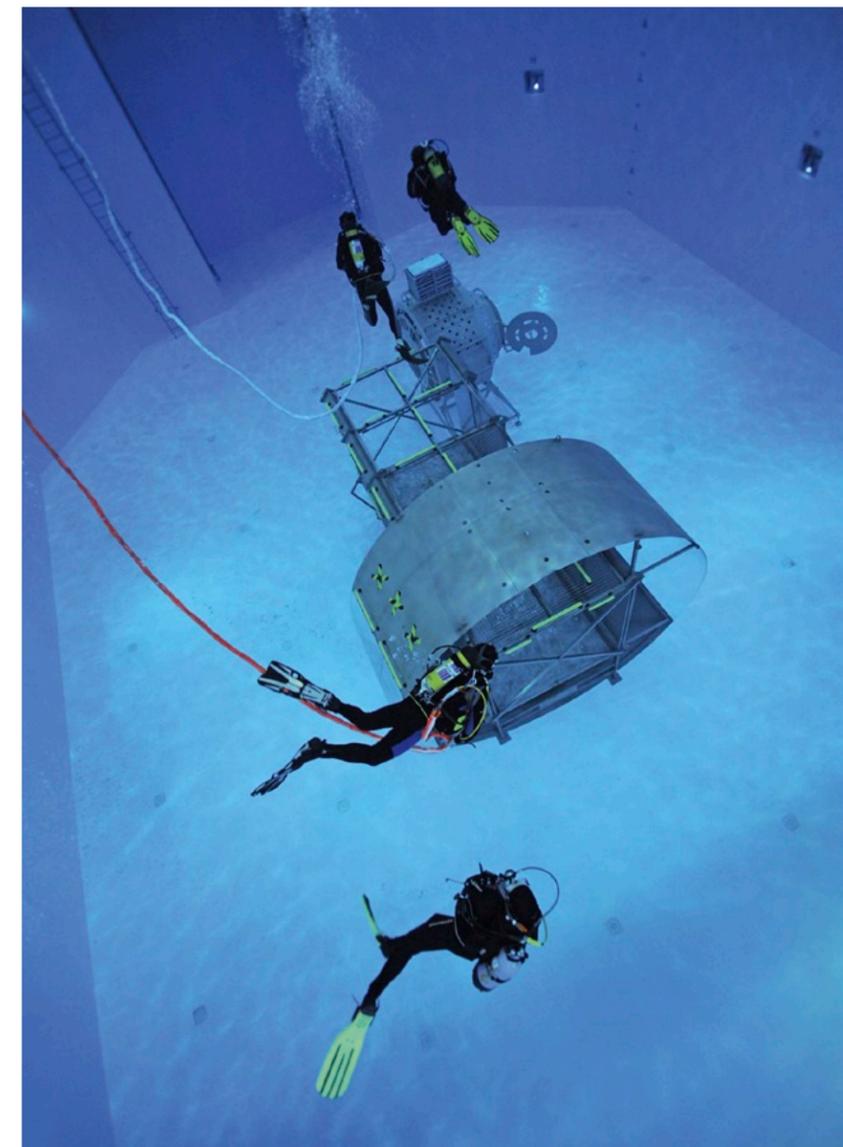
Space Diving

"Fuglesang is one of several astronauts we've had in the pool with us," explained Sabine Klassen. She is a PADI instructor and part of the team that is responsible for training the astronauts. On weekends, she often works with curious onlookers to guide divers around the facility, providing the necessary introduction to scuba dive with overalls and surface-supplied air. Often, she goes into the pool to make sure everything is okay.

Spacewalk under water

The apprehension was tangible as the first two divers entered the pool. They kitted up on a special submersible platform in the end of the pool, checked their kit and rehearsed the tasks ahead.

The dive was not to swim to enjoy the scenery—all



training pool, which is seen as very important. On the ESA's website, the Belgian ESA astronaut Frank de Winne writes:

"Learning the controls underwater is an essential part of the basic training needed to conduct a spacewalk. Everyone going through this programme needs to get a diving certificate, because the conditions under which you work in space are similar to those found under water."

Also for regular divers

Some fellow divers and I were at ESA's Neutral Buoyancy Facility for a photo workshop held by the German nature and underwater photographer, Eckhart Krumholz. There were unfortunately no genuine astronauts present—one of them was actually up in space—but time in the pool is offered on weekends to regular divers, who can come and enjoy the pool and workout facilities at close range. Every day, a group of ten to 12 dive tourists

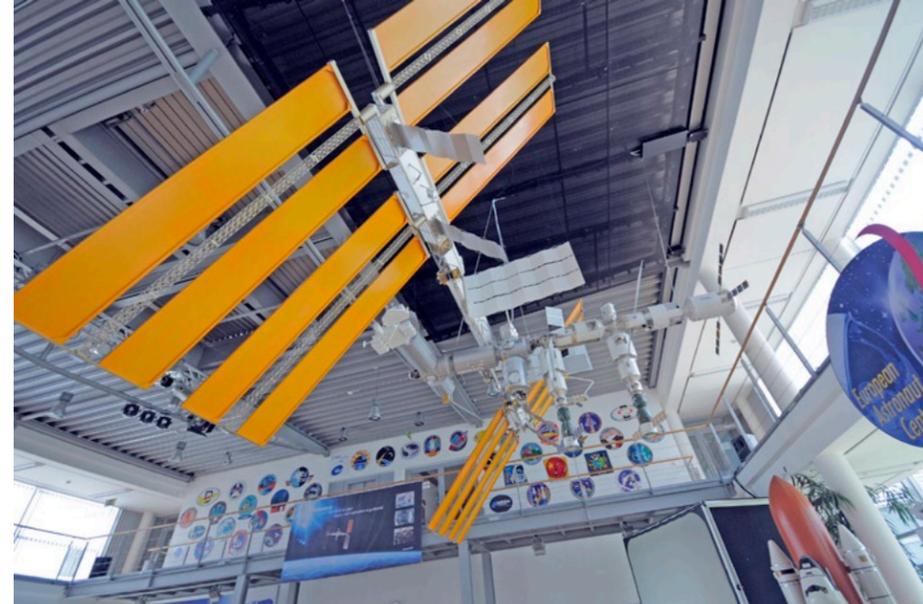
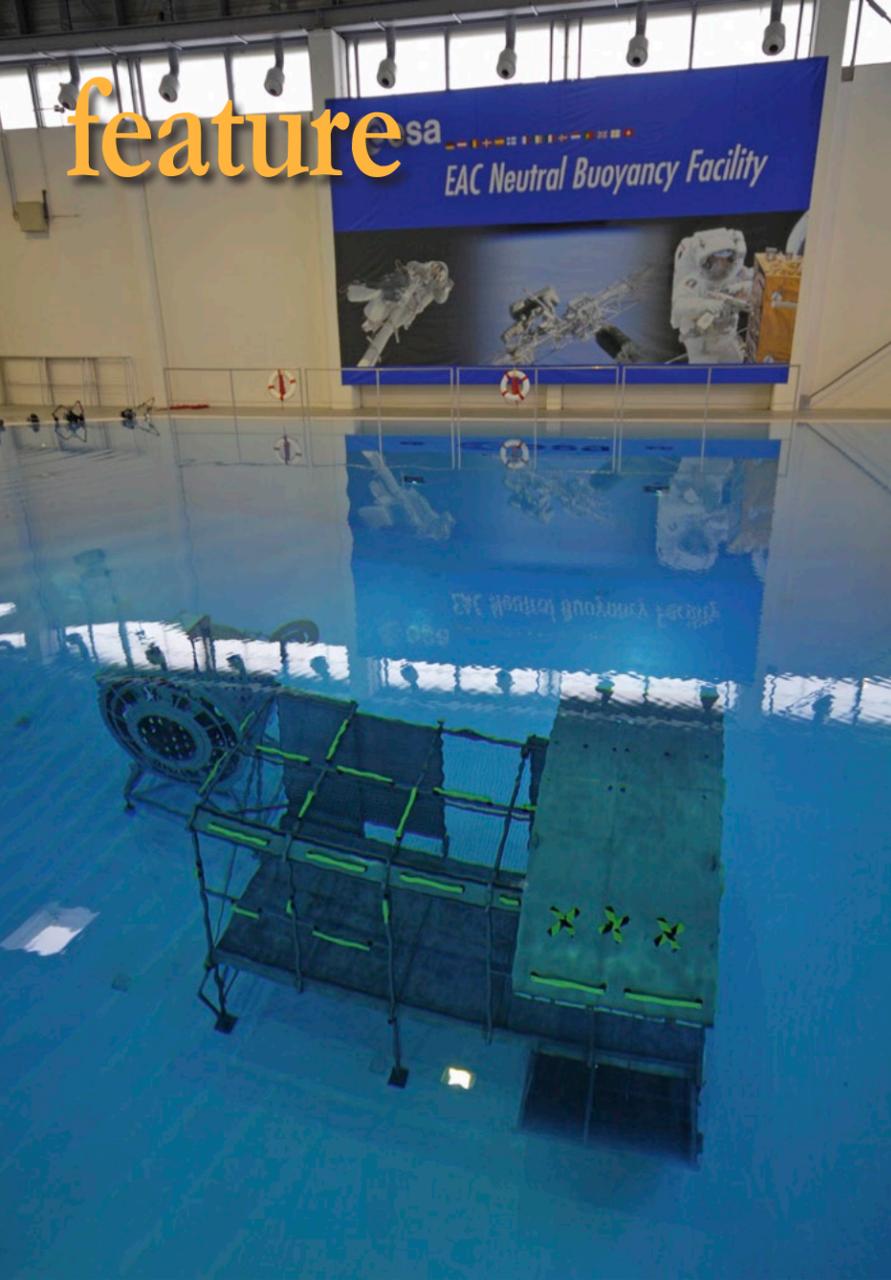
from various locations in Germany and Switzerland were given a tour of the facility with the option of playing astronauts in the pool, giving us good opportunities to shoot some footage.

A day at the Neutral Buoyancy Facility costs 399 Euro and lasts for nine hours, and, despite the rather stiff price tag, space diving is very popular. Many dive clubs organize annual trips to this place, as it provides an interesting and fun diversion from diving in lakes, especially for those

who have a long way to the ocean.

Fuglesang in space

Christer Fuglesang of Sweden is one of the astronauts who has been trained at the Neutral Buoyancy Facility EACs. When we visited the center in September, Fuglesang was in space, where he performed a repair on the space station. Parts of the training and preparations for the repairs had been done in the pool we dived in, putting an extra edge to the diving.



outer space.

The divers tested communications in full face masks, breathing and making sure the air cylinders on their backs were open and ready for action, just in case anything should happen to the air supply from the surface. Then, they gently descended along the ten-meter-high ladder at the edge of the pool leading down towards the bottom. Once there, they were escorted to the Columbus module by

the safety divers and the mission could begin.

The solar panel is defective

The first two divers in the water were probably given the most exciting mission this weekend; they had to “fix” a solar panel that had not deployed. To achieve this, they first had to retrieve a bag of tools that were attached to the roof of the Columbus module, and then move to the top of the MIR module where the solar panel was placed.

Meanwhile, safety lines had to be clipped on, and it was a laborious journey before they were ready for action. Out of the tool bag came a suitable wrench and one of the divers unfastened the

bolts that held the solar panel in place. Once the bolts were loosened, the panel unfolded like an accordion and shot towards the surface. Hence, the power supply to the module was secured.

Mission Control

When the mission was accomplished, the divers were guided back towards the ladder and strenuously climbed up to get to the surface. Up on the platform, they received well-deserved applause from both diving and non-diving friends, who had watched it all from the control room

Space Diving

next to the pool. From here, the entire pool was monitored by a number of video cameras, images from which were displayed on a wall of monitors.

The water boils

Photographers in the workshop were diving with regular diving equipment, and so did several of the visiting divers. Even if the pool was huge, there was at times quite heavy traffic, with both astronaut trainers and spectators in the water at the same time. Everyone was scrambling around the “astronauts” to see what they were doing, and the amount of air bubbles was impressive. From the surface it looked like the water was boiling!

In space, astronauts probably have considerably fewer spectators—but here, they are also on their own and must be capable of coping with tasks unassisted while managing challenging and time-consuming labor handling hardware costing billions. If something goes wrong in space, the consequences are slightly larger than in a pool at the Cologne air-



FACTS ABOUT SPACE DIVING

TRAVEL / LODGING: We flew to Düsseldorf and took the train that runs between the airports of Düsseldorf and Cologne (approximately 1 hour). Accommodation was found in the affordable Art Hotel just a few minutes drive from ESA headquarters.

DIVING: Diving in the pool's maximum depth of ten meters. Yet, one must be aware of no flight times—use the computer. It is always safest to wait at least 12 hours before flying home.

PRICE: One day (about nine hours) of space diving costs 399 Euro. This includes a guided tour of the facility, the introduction of ESA's activities, a dip of approximately 90 minutes in “astronaut equipment” and the opportunity to dive with standard equipment in the pool.

SEE: www.spacediving.de or www.esa.int

port.

For the underwater photographers, it was sometimes crowded, and sometimes sharp elbows were encountered in order to get the good shots. With the limited depth, good time was assured, and with several other “astronaut-pairs” entering the water, good opportunities were provided for wide-angle photography without including too many divers in the background.

Try astronaut diving!

Getting to Cologne was relatively easy and inexpensive, at least for Europeans. The nearby city of Düsseldorf, where trains depart for the Cologne Airport, is one of the major hubs in Germany and in my case, was only a one-hour flight from my residence in Norway. From here, it was only a short taxi ride to the Art Hotel in Porz district, which is just a minute's drive from the entrance to the ESA complex. If you fancy a different kind of diving, space diving is highly recommended! ■

THIS PAGE: Scenes from EAC space diving



technical matters

— Reprinted from AquaCorps, Issue No. 1, February-March 1990
The Independent Journal for Experienced Divers

20 years on...
AquaCorps
...What has changed?

Call it “High-Tech” Diving

Some of the most experienced leaders in the scuba world are dead set against releasing information—let alone encouragement—on the diving methods under discussion here.

Text by R.W. Bill Hamilton, PhD.

A new category of diving is taking shape in the recreational diving world that sparks controversy and is a cause of great concern. This, in general terms, is diving deeper and staying

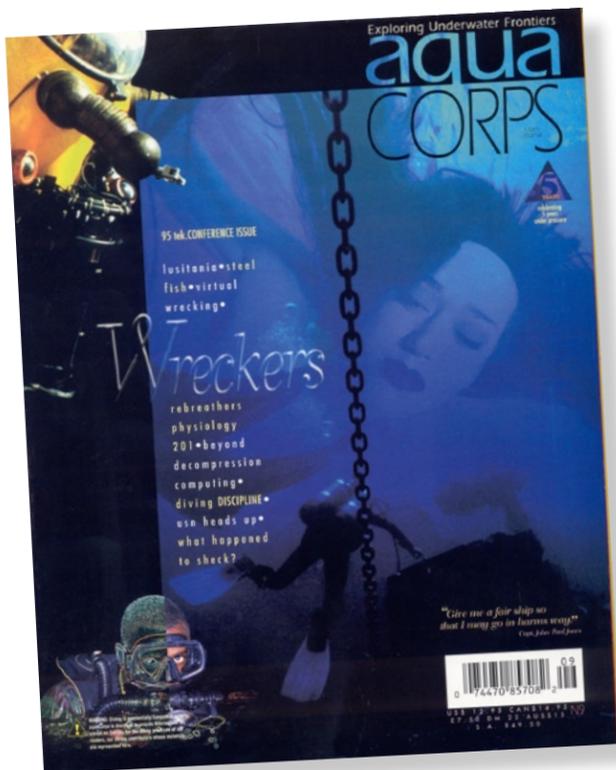
down longer than the traditional limits. Although by no means new, for many years it was a cause for concern more than controversy. There was general agreement that it was surely dangerous, was not approved by anyone, and one could say with a clear conscience, “Don’t do it”. Now methods are coming along that, for the price of extra effort, make it possible to extend both depth and bottom time with what is regarded by some as an acceptable degree of risk, and in comparison with older methods, some tempting efficiencies.

Limits of traditional recreational diving

Recreational diving is defined by the so-called *training agencies*—the organizations of diving instructors (NAUI, PADI, etc.)—as no-stop scuba diving with air to 40 metres, or 30 feet. Many more experienced divers push beyond that envelope, either by doing longer bottom times that require decompression stops or by going deeper. Although there are often some definite objectives for these dives, they are nevertheless being done for fun, so it still comes under the recreational label. It does not, however, fit within the traditional definition. A new term is needed.

The training agencies discourage the use of the term, *sport diving*, because it implies some sort of competition. A colleague mentioned that he saw two young divers holding onto the bottom with their BCUs inflated, then letting go and racing to the surface. It is appropriate to discourage that sort of competition, just as it is the equally risky practice of seeing who can swim the farthest underwater in breath hold

This article describes the new technology, setting the stage for future articles that explore some of these methods in more detail, but it also contains a serious caveat about all this: It has to be done properly, or it should not be done at all.



So, what is AquaCorps?

Text by Rosemary E. Lunn

Corey Mears from Light Monkey mentioned it when I was interviewing him. You never know what connections you are going to make through diving, and the path each individual relationship will follow. Flying into Sydney early Saturday morning, I had no idea that a few hours later I would meet Michael Menduno at OzTek 2011. Some of you will be reading this and wondering—and yes, it was him, the one and only Michael Menduno—the rest of you will have absolutely no idea of who I am talking about. Let me fill you in...

Jump back to the summer of 1996 and British Cave Diver Mike Thomas presents me with a copy of aquaCORPS magazine, (and I still have this issue in my office today). It was a defining moment in my diving career. Mike had taken me under his wing, showing me there was more than 30 metre, single tank, recreational, air diving. The aquaCORPS issue was N11, October / November 1995 and I vividly remember being thrilled to learn of a brave new world of diving.

The Man

The power behind *AquaCorps* was Menduno. He conceived and edited “the independent journal for experienced divers”, commissioning a *crème da la crème* stable of knowledgeable diving pioneers to write for him. The resulting prose was greedily consumed by every diver wanting to know more about the evolution of sport diving—the new and exciting movement—high-tech diving.

AquaCorps was born at a very exciting time, and it certainly greatly influenced the technical diving revolution of the late 80’s to early 90’s. *Wired Magazine* described it as “The Sea Geek’s Bible”, and if you ever wanted confirmation of this, just talk to pretty much any technical diver of note today. They will all agree on one thing—the publication

that greatly influenced their personal diving was *AquaCorps*.

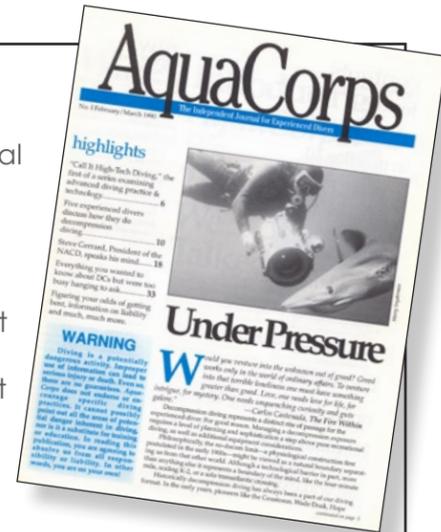
Bumping into Menduno at OzTek was the moment I met a personal diving hero. Later, over a game of pool, I was delighted to discover he was an utterly charming, approachable and generously spirited man. We talked about *AquaCorps*, writing, rebreathers, diving and magazines. Sometimes all the very best things happen over a beer. “Would it be okay for X-RAY MAG to republish articles from *AquaCorps*, starting with issue one, Michael?” I asked. “Yes, sure Roz,” said Menduno.

High Tech Renaissance

Ironically, we are now enjoying a renaissance in high-tech diving. In the last two years, there’s been an explosion in sidemount diving. PADI is now moving into rebreather training, with other agencies wanting to follow the same path, hot on their heels. So, grab a cup of coffee, take your phone off the hook, indulge yourself with a moment of peace and discover what influenced so many of today’s leading technical divers. Some of these articles are just as pertinent today as they were when they were penned, and others are a charming look back at how we were. Either way, enjoy this slice of diving history, with many grateful thanks to Michael Menduno and *AquaCorps* magazine. ■



Michael Menduno of AquaCorps magazine





tech talk

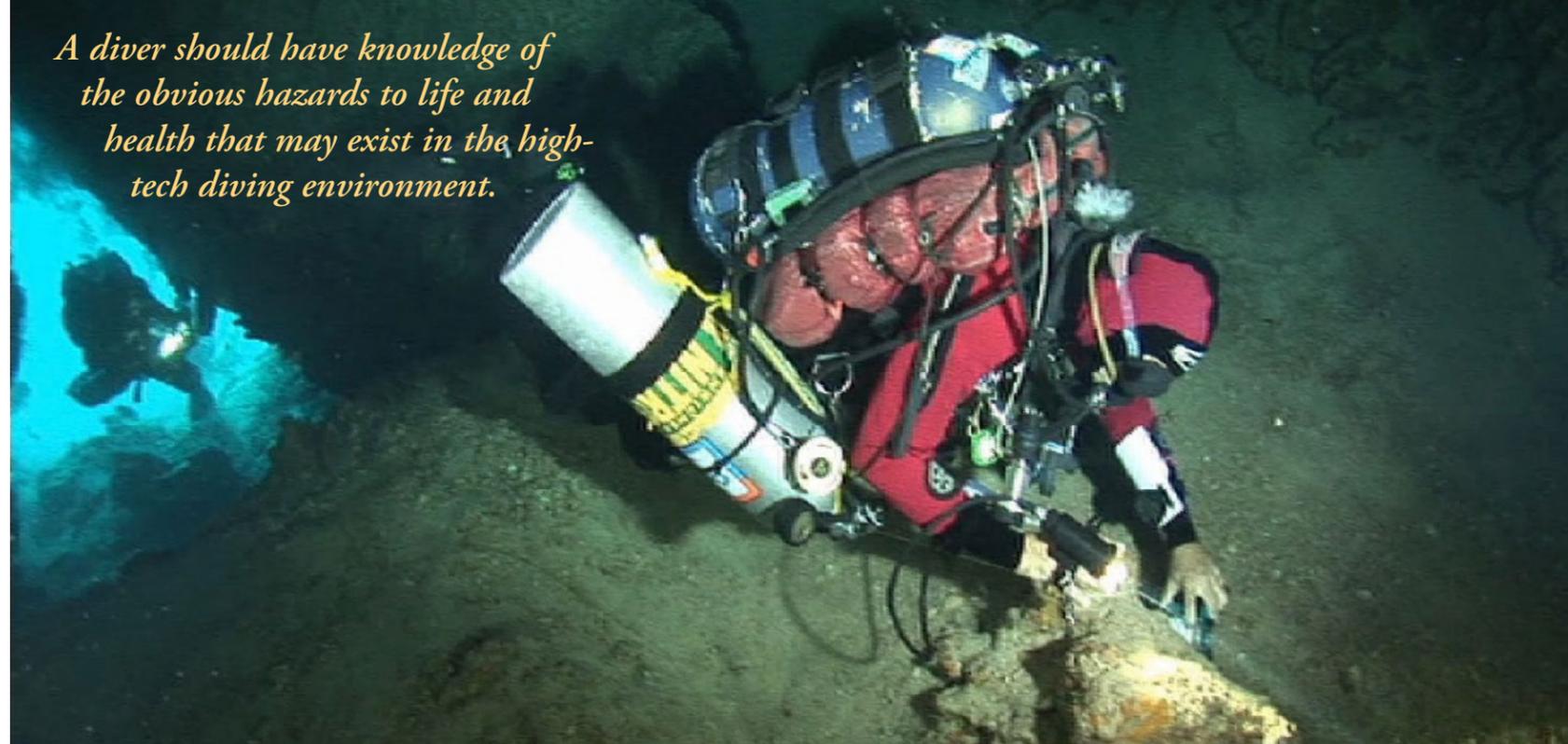
What does it take to be prepared for high-tech diving? Knowledge, practice, the right kit and good planning.

dives. Certainly, advanced divers can practice their sport without dangerous interpersonal competition, so the term, sport diver, does not meet our needs. Competition is indeed a motivation, not so much for the depth and time records—since nowadays they are limited to those willing to make exceptional efforts—but to be the first in an unexplored cave, or the first to look into a virgin wreck.

Sport does not fit the bill here.

Two other names seem to be suitably descriptive. One is the possibly underused term, *advanced recreational diving*,

A diver should have knowledge of the obvious hazards to life and health that may exist in the high-tech diving environment.



which already has many specific meanings, but is perhaps valuable for its ambiguity. This applies to a diver working outside the no-stop, 40-meter (130-foot) limit, regardless of the technique used. The other, *high-tech diving*, relates to the new methods but does not include all situations, since the traditional limits can easily be exceeded with standard gear. The task of picking a single all-inclusive term can be left to others; for now, I am calling dives outside the traditional limits advanced, and those done outside those limits using equipment other than standard wetsuits for thermal protection, as high-tech.

Novice divers, it seems from the accident reports do equally risky things, apparently without recognition of the risks involved.

This includes the use of dive computers and new decompression techniques, dry suits, scooters, multiple or over pressurized tanks, as well as special gas mixtures. Use of dry suits and dive computers within the traditional depth and decompression limits can be considered traditional diving, although some special training is needed. While some of these high-tech items are relatively new to recreational diving, many of the terms are old stuff to commercial divers.

The need for competence

Considering the unforgiving nature of mistakes in diving, just talking about advanced and high tech diving has to be done with caution, lest it lead innocent lambs to the slaughter. Therefore, this general topic has to lead off with a note on competence. We cannot proceed without such a caveat.

Somehow it seems unnecessary to warn a novice skier against trying an international head-over-heels flip (some of us do them



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occasionally without intending to, but that is another matter). But novice divers, it seems from the accident reports do equally risky things, apparently without recognition of the risks involved. Something that may involved just a little extension beyond standard limits, if it seduces a diver into running out of air at depth, can be a great deal more risky than trying a flip on skis. Divers do these things. Therefore, allow me this bit of preaching on competence.





Before doing a new and dangerous thing, one must be highly experienced in it. The way around this double-bind is practice, something one can do at any level of experience.

High-Tech Diving



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Many things can be done with acceptable risk, even flips on skis, by someone competent to do them. But in advanced and high-tech diving, there are many things that seem easy and indeed are easy for experts, but which can involve unacceptable risk for ordinary divers. The bottom line is: divers must become competent in new

diving practices before sticking their necks out.

The need for proper knowledge and training is not a new idea. When numerous commercial diving fatalities swept the early days of offshore oil exploration in the North Sea, a

number of regulations were issued that addressed proper equipment and procedures. But they had no great impact on the safety record.

The thing that brought about a sharp reduction in fatalities was an emphasis on competence. Although this is hard to define, it was followed by specific requirements for training, certification, and updating of divers and their supervisors.

And it has worked. Many of the early accidents were human error, and while it is difficult to legislate that people must not make mistakes, it is possible to ensure that they at least know—and know well—the right way to do risky things.

All this is merely a prelude to a difficult task: to discuss what is happening in

advanced, high-tech recreational diving without encouraging people to try things they are not prepared for, and thus, to lead them into situations they cannot handle.

So, in very general terms—you heard it here—don't do it if you do not know what you are doing.

Training and then competence

What does it take to be prepared for high-tech diving? Knowledge, practice, the right equipment and good planning.

First, a diver should have knowledge of the obvious hazards to life and health that may exist in the high-tech diving environment. In addition to knowing when an oxygen mix can be expected to explode, this includes an understanding of the body's physiological limits, first in the classic *black and white* limits, but also in the duration of exposure as well as other environmental and physiological factors.

Necessary knowledge includes the procedures and practices to be used—not just what they are but what they mean, the consequences of deviation, and how best to proceed when things are not going to plan. Familiarity with equipment is also critical—how it works, how to use it, how it should be maintained, and what to do when it malfunctions.

Considering the unforgiving nature of mistakes in diving, just talking about advanced and high-tech diving has to be done with caution, lest it lead innocent lambs to the slaughter.

Next is practice

And I offer this as the proverbial Catch-22: before doing a new and dangerous thing, one must be highly experienced in it. The way around this double-bind is practice, something one can do at any level of experience.

An aspiring advanced diver should practice all the various steps that are required, from reading a table to connecting apparatus. Practice things in parts, then link them together. Practice first with everything right, then with some various different, and finally, with some things out of order. And take small steps; perhaps it is best not to try to stage bottles and oxygen in the water the first time you use your new dry suit.

Consider the pilot of a high performance jet; it may take only a few months of round-the-clock training to learn to fly it, but this practice must go through many stages before real proficiency is achieved. What some world-class divers do is every bit as challenging as flying *Top Gun*; divers have a different task, but they will be just as dead if they screw up.

Much of the high tech in high-tech diving has to do with equipment. It need not be the most expensive, but it has to be right for the job. Know that it is right, and know that it is working and in good shape. Pilots may not take their own planes apart, but they do have to know when the aircraft needs fixing. Likewise, whether or not you design, build





Much of the high tech in high-tech diving has to do with equipment. It need not be the most expensive, but it has to be right for the job.

High-Tech Diving



or maintain your own dive gear, you do need to know how to tell when it is—or it is not—right.

The last item on this list is planning, but it may be first in importance. All modern divers get some training in dive planning, and let us hope that they all use it. Planning a high-tech dive is no different in principle, but it can be a great deal more complex. Not much more needs to be said here, just be sure to make planning a fundamental part of every dive.

Getting the technology

It is one thing to instruct new high-tech divers on the importance of learning, it is something else to provide the necessary information.

Likewise, preaching about *the right equipment* does not make it available, nor does it define what is needed. How does one go about getting the information—the

knowledge—do to advanced and high-tech diving?

There is no easy way. Some of the most experienced leaders in the scuba world are deadset against releasing information—let alone encouragement—on the diving methods under discussion here. And they are right to be. The word-of-mouth network that gives someone just enough information to get started but not enough to do it right, is extremely dangerous.

Proper textbooks and courses are hard to come by for several reasons. First, most recreational divers shouldn't consider advanced, high-tech diving because they cannot—or will not—get the necessary knowledge and training to do it safely. Second, those who train divers as a profession don't want to add to their own woes; and the average instructor seldom has the specialized knowledge anyway.

Third, the scientific diving community, who, while diving professionally, generally use recreational diving practices; they are not eager to see an excess of recreational diving accidents threaten their programs. A final point is perhaps the most important, things are not well enough developed that a crisp textbook can be written; we basically do not know as much about this as we would like.

Even so, state-of-the-art does exist, and because high-tech diving is here to stay and is going to continue to be used, books and courses will become available in time. Several university diving programs are beginning to move into advanced diving practice, standards are being developed, and the documentation is slowly taking shape.

Organized programs are another approach. At present, virtually all of the high-tech divers are individuals

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working alone. Each has his or her own equipment and procedures, maintenance, and planning practices; only when diving with partners will he or she follow the same dive profile as someone else. So in organized groups, individual divers can follow the group's practices and can gain experience with risk reduced to the practical limit. This is not widely available yet, but it is coming.

Another tried and true way to learn new tricks is from someone who already knows how. How do you know if a diver already knows how?

How do you know

when your expert is telling you the right things? Obviously you check his track record, find out how he got his training, and how he is regarded by the community.

Our contribution is to offer more specific details in future articles, including a review of the activities being carried out by high-tech diving programs.

Risk

At some point, it is necessary to discuss risk. Diving is a risky enterprise. Like anything else, the risk involved is directly related to the style of the practice. Some automobile drivers go their entire lives without accidents, others have them all the time. Most of the factors that influence driving risk are well-known, with attitude—the strong desire to drive safely—being the most important item. Diving is the same, and the

consequences of an accident—a loss of control—are just as serious as in driving.

In a recent talk on fitness to divers, Dr Fred Bove said, "The first guy to be eliminated should be the one who runs out of gas on the freeway." There is no such thing as perfectly safe diving, any more than there is a decompression table with a true zero-bends incidence. The only way to be perfectly

safe underwater is to stick to cold showers. But diving can involve an acceptable risk.

Recreational diving, as currently practiced, has less risk than

many other activities, both sport and occupational, and the risk is acceptable to most. Advanced high-tech diving will involve a higher risk than routine diving, but the risk can be kept within acceptable limits by having the right attitude and by following guidelines like those given above. If you do not intend to do it in a safe way, then for goodness sake, don't do it at all.

Experience deserves a special emphasis here. Whether they be metallurgy

Running out of gas is more serious in diving than in driving, but the point was made. The guy who runs out of gas or suffers frequent fender benders has no business in high-tech diving.

or medicine, practices that work on numerous occasions are generally regarded as *acceptable*. This is certainly the way decompression tables become validated, and other diving practices might follow the same path. Although this is a complex issue, since real depth of experience is generally lacking, the principle holds.

Current high-tech diving practices

For those who have paid their dues and bravely read the sermon, it is now time for a brief discussion of what this is all about. As explained, any proper diving outside the

High-Tech Diving

recreational guidelines is advanced. This includes air dives in the range of 40 to about 60 meters (130 to 200 feet)—more or less within Navy and commercial limits, and those to greater depths, in some cases exceeding 90 meters (300 feet)—which almost invariably carry too high a risk

to condone. Deep air dives deserve further discussion, first to elaborate on the risks, but also to relate what has been done.

The next methods are in a category best called, *special-mix diving*—that is, dives done with gas mixtures other than air. Of these, the most common are two types of *nitrox* diving. Nitrox, a mixture of oxygen and nitrogen with a composition different from air, is for use in undersea





tech talk

habitats and has less oxygen than air. This method offers certain specific advantages, the main one being access to the depth range of from 10 to 60 meters with very long bottom times, and little or no decompression following excursions (depending on the depth of the habitat).

The term, nitrox, is also used for a mixture of air and oxygen more properly called, *enriched air nitrox*. This method, or EANx, is useful in the range from 10 to about 35 or 40 meters, and allows greatly increased bottom times with no increase in decompression time. It is being used by some university diving programs, is described by the NOAA diving manual, and is beginning to be embraced by recreational divers.

There are two main hazards to EANx, both related to its oxygen content. Since excess oxygen is being breathed, the possibility for toxicity must be accounted for,

and handling mixtures rich in oxygen is a fire and/or



explosion hazard. Decompression tables for EANx diving can be derived from existing air tables by the *equivalent air depth* calculation, but some advantage can come from custom table computation.

Perhaps the most exciting of the special mix methods are *trimix* and *heliox* diving. Trimix involves the use of mixtures of helium, nitrogen and oxygen that are appropriate for diving in the range of 50 to 100 meters. At the deeper end of this range, a mixture of helium and oxygen, with little or no nitrogen, is better. Trimix or heliox diving takes considerable operational planning and preparation because of gas logistics, problems and, in most cases, special decompression tables are needed. Logistics applied first at the level of mixing—which takes both skill and equipment—and later, at the level of breathing, since all the gas needed for a deep Trimix or heliox dive cannot normally be carried by the diver.

Still another special mix method involves the use of rebreathers. These supply gas to the diver in a closed or semi-closed loop from which CO₂ is absorbed. They are not readily available to recreational divers, but some scientific diving programmes are beginning to use them, and they have been used for years by many navies. In addition to long in-water times, rebreathers offer the possibility of optimal oxygen level to gain decompression advantages. The need for

High-Tech Diving

redundancy in the event of system failure is a problem in some applications.

As mentioned, other high-tech items are having an impact on diving. Dive computers make variable depth diving (multi-level) and repetitive diving more accessible, albeit with meaningful risk of decompression sickness unless certain precautions are taken. Dry suits are making all types of diving more comfortable, and with proper training this is probably with less overall risk. Dry suits are essential for the long dives possible with special mixtures.

With all of these warnings issued, and all of the described parameters met, advanced high-tech diving offers the prepared, knowledgeable diver a change to experience a realm not previously accessible to humans. And there is every reason to think—as our technology and knowledge advance—that we will be able to push the envelope even further. ■

Bill Hamilton, a physiologist with 25 years of specialization in the diving aerospace and environmental fields, has spent much of his professional effort bridging the gap between the laboratory and the field. A resident of Tarrytown, New York, USA, he is the principal in his consulting firm, Hamilton Research, Ltd., where his work includes the development and assessment of commercial, institutional, and government decompression procedures.

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Text and photos by Lawson Wood

False Killer Whales

— *Enchanting Cetaceans of Dominica*



Once or twice in a rare Blue Moon, opportunity sometimes comes along and hits you on the head—or in my case, I was hit on the head—by a juvenile sperm whale.

Let me recap. Along with a small group of like-minded conservationists and underwater photographers, we were working under a special permit issued by the Ministry of Agriculture and Fisheries on the Island of Dominica (pronounced *DOMINEEKA*) to try and identify returning sperm whales and other cetaceans.

Dominica is the youngest of the Caribbean islands and is flanked by Guadeloupe to the north and Martinique to the south, which are both French colonies. Inevitably, many of the locals speak a derivative of a French, Carib and West African creole known as Kwéyòl.

Ancestors of the original Carib Indians, the Kalinago still live by traditional fishing and farming methods and are rather distinctive in appearance, resembling South American Amazon tribes and are much shorter in stature.

The Kalinago name for the island is Wai'tukubuli. The local beer is called Kubuli!

Extremely mountainous in aspect, two of the peaks are over 1,300 metres (4,500ft). I can honestly say that the topography is incredible with fantastic rain-forest fauna and flora all found within cloud-topped peaks, dra-

Eye of scarred sperm whale, Band Aid



CLOCKWISE FROM LEFT: Pod of false killer whales patrol the seas around Dominica; Rugged coastline of Dominica draped with mist; Pair of false killer whales (inset)



matic gorges, caverns, waterfalls and hidden lakes. There are many hot sulphur springs and one of the dive sites is known as "Champagne" due to the continuous streams of bubbles coming up through the reef.

The underwater reefs also resemble more tropical dive sites due to the rarity of curious fish species, thousands of colourful crinoids, black coral forests and superb colourful sponges.

And so to sea...

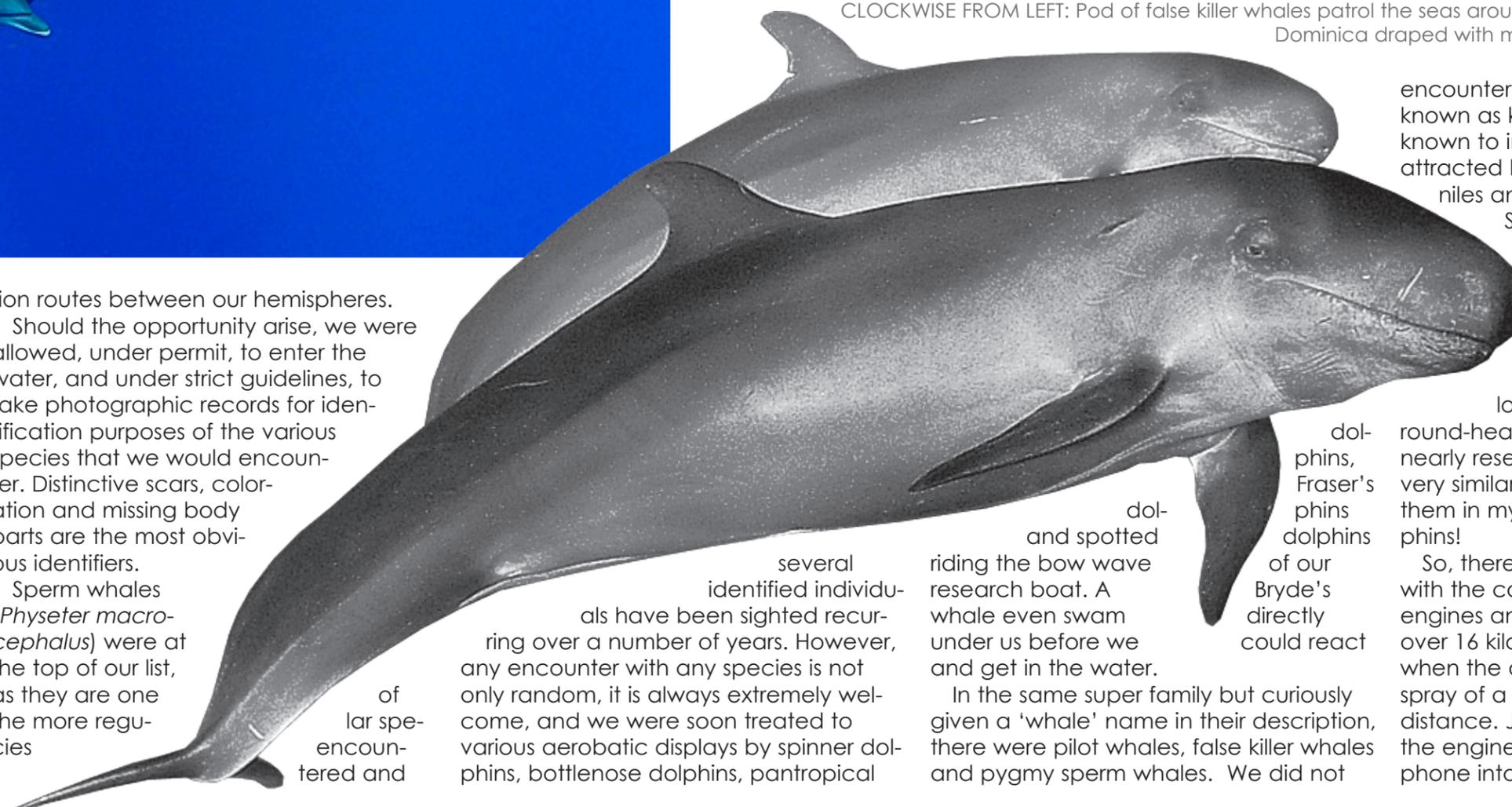
Struggling along approximately five to ten miles off the western (Caribbean) coast of Dominica, our goal was to catalogue as many cetacean species that use these deep waters as breeding and feeding grounds on their annual migra-

tion routes between our hemispheres.

Should the opportunity arise, we were allowed, under permit, to enter the water, and under strict guidelines, to take photographic records for identification purposes of the various species that we would encounter. Distinctive scars, coloration and missing body parts are the most obvious identifiers.

Sperm whales (*Physeter macrocephalus*) were at the top of our list, as they are one of the more regular species encountered and

of lar spe- encountered and



several identified individuals have been sighted recurring over a number of years. However, any encounter with any species is not only random, it is always extremely welcome, and we were soon treated to various aerobic displays by spinner dolphins, bottlenose dolphins, pantropical

dolphins, Fraser's dolphins and spotted dolphins of our Bryde's directly could react riding the bow wave research boat. A whale even swam under us before we and get in the water.

In the same super family but curiously given a 'whale' name in their description, there were pilot whales, false killer whales and pygmy sperm whales. We did not

encounter any orca (unfortunately also known as killer whales), but they are also known to inhabit these coastal waters, attracted by the large number of juveniles and calves of the larger whales.

Speaking of which, whilst orca are members of the dolphin super family, so are false killer whales. Like orca, false killer whales are also known to prey on other dolphins and sperm whales, however they look more like pilot whales, or round-headed dolphins, than anything nearly resembling an orca, yet they have very similar behaviours. I have renamed them in my personal logbook as killer dolphins!

So, there we were, bobbing along with the constant drone of our vessel's engines and the roll of the oceanic swell over 16 kilometers (ten miles) offshore, when the distinctive plumed exhalation spray of a sperm whale was seen in the distance. Jerry, our captain, quickly cut the engines, dipped his directional hydrophone into the water and confirmed the



THIS PAGE: Views of the cheeky juvenile sperm whale, Band-Aid—nicknamed thus due to the scar over his left eye—that pushed underwater photographer/dive writer Lawson Wood out of the way with its large head

sonar clicks of a juvenile sperm whale.

We maneuvered into position ahead of our moving target and quietly slipped into the water. Undeterred by our presence, this young small fellow, at over 12 metres (40ft) in length actually swam directly towards us (me!) I then found myself squished between the research boat and a the spy-hopping whale, which casually shunted me out of its way by its rather large and scarred head.

Hey, don't worry—I was out of there! This was a BIG baby beast, which quite pointedly informed me who was the boss.

After the initial shock and seeing my compatriots swimming off after Scarface, it took all of my effort to catch up with them. The sperm whale, which deigned to allow me to have an encounter, can only be described as magical. Now nick-

named, Band-Aid, due to the curious scar over his left eye, he put up with our intrusion into his space for over 20 minutes before he very obviously vented all of his orifices and sounded in front of us. What an end to a rather perfect day.

Day two

Day two was another matter altogether. There was an ocean, empty of noise, out there.

We motored and plunged through a rising oceanic swell, and the constant rain battered our hopes. It was so bad at one point that we lost sight of the island of Dominica. Our captain continually tried the hydrophone, but other than a few distant dolphin clicks, there were no whales within ten miles of any of our positions.



CLOCKWISE FROM ABOVE: Landscape shot of Dominica; Playful dolphins mixing in the waves; Typical Dominican homes dot the hillside; Wild dolphin leaps out of the sea

Our team leader Brandon Cole (ever the optimist) informed us that there may not be any whales in our research zone, as they always swim away whenever false killer whales are in the vicinity—a behavior that had been observed on previous occasions. “So, keep a look out for false killer whales!” he said.

They are kind of like large dolphins, with that same wry, or sly grin, but are almost black in colour and have rounded bulbous heads, not dissimilar to a pilot whales.

Impatiently, we strained our eyes as the very patient boat captain scoured the ocean and deployed his hydrophone to search for any indication of life in the depths.

We did not know at the time, but when false killer whales are hunting, they travel in stealth mode—completely silent—as

they attack their intended prey. So, the ocean was silent—for hours—and then, just in front of us, a black, rounded head breached, and then several more immediately behind it.

Brandon Cole immediately identified them as false killer whales (*Pseudorca crassidens*). They were hanging around, enjoying their own company and socializing.

Get in the water!

With heightened adrenalin and nervousness, we all entered the water and swam slowly towards where the group could be seen



on the surface. They certainly spotted us before we spotted them underwater in the low visibility, as we were quickly battered by their sonar clicks when they all swooped around us, to check out visually what their sensors were telling them. (Stupid, slow, landlubbers, pretending to be dolphins, uttering unrecognizable



squeals and whoops trying unsuccessfully to communicate our love and passion for the species!). What a joke. They left us floundering about on the surface.

Just when we were about to give up hope and return to the research boat, a young bottlenose dolphin (*Tursops truncatus*) appeared.

Very quickly, a large male false killer whale returned, swam in and started to escort his ‘cousin’ towards the larger group, then a second false killer whale appeared and acted as ‘shot-gun’ on the other side of the dolphin. I had a moment of unease over the plight of this young fellow, as false killer whales are

known (as mentioned) to go into stealth mode when hunting, but when interacting with other dolphins, they have been observed to mimic the sounds of other species and also to actively hunt and kill other dolphins.

I may well be wrong, but, for me, it looked like a young dude had just swam into the wrong neighbourhood. Soon, the small dolphin was in the middle of at least ten BIG guys, many of whom were exhibiting very obvious sexual behaviour, as well as rather exaggerated movements. Thankfully, whilst this scene was being played out beneath us, we all had a window of opportunity to duck-dive down and quickly snap as many photographs as possible of this quickly changing scenario.

The false killer whales (killer dolphins) have a very distinc-





tive, rather large, toothy, sly grin, which they continued to flash at us, as if they were stating, "We know something you don't," or, "Don't mess with us—we may look like we are smiling, but the teeth are big and sharp, and the little guy is ours!"

I had a rather unsettling feeling, which, as the pack led this young innocent dolphin away from us, that this may be the last time anyone would ever see the dolphin again.

Our group was somewhat stunned, yet exuberant over the encounter, yet all of us had quite an uneasy feeling during

the encounter. Rather humbling, these beasts made us feel amateurish, ungainly and clearly out of our depth.

The rest of the week yielded few results other than sightings of small dolphin groups, the killer dolphins had certainly spooked the bigger whales as well as ourselves. Deciding to concentrate on a few reef dives before leaving our lodgings at the Titiwi Inn in the capital Roseau, we were soon enthusing about the very high quality of reef life, colourful critters and friendly fish.

Dominica had certainly lived up to its reputation as being the

whale watching capital of the Caribbean, but no-one had prepared us for the quality of the reef diving.

Things you need to know

As Dominica was formerly a British protectorate, electricity is all 220v (British style plugs).

Most hotels will have 110v adapters.

Driving is also British style, and cars usually drive on the left side of the road. For those more nervous types who would rather not negotiate the narrow, winding, often single-track roads on the island, there are local taxis and minibuses that are quite inexpensive and very regular.

Currency is the EC\$ (Eastern Caribbean Dollar) which is approximately 2.67 to the U.S. dollar. U.S. dollars are accepted everywhere, but the exchange may not be in your favour.

Flight services are handled

by America Eagle (American Airways) from Miami and Tampa (via Puerto Rico) or with Liat or Winair for transfers from Antigua, Barbados, Virgin Islands, St. Maarten, Guadeloupe, Martinique and St. Lucia. There is a departure tax of EC\$59.00 (US\$23.00) payable at the airport.

For those who love island hopping, there is a 300-seat catamaran ferry that operates between Guadeloupe, Dominica, Martinique and St. Lucia.

Whale watching scientific permits are rarely issued and then only to bona fide enthusiasts who will pass over photographs and a report to the ministry in charge. Tourists can go whale and dolphin watching on a number of boats, but are not allowed in the water.

The Dominica Hotel and Tourism Association (DHTA) can be found at: Dhta.org. Diving information can be found at: Dominicawatersports.com.

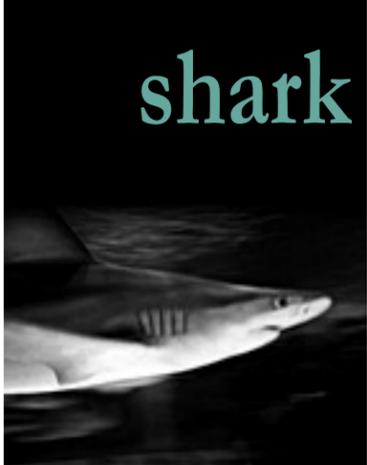


Dominica

Lawson Wood was raised in the Scottish east coast fishing town of Eyemouth and spent his youth exploring the rock pools and shallow seas before learning to scuba dive at the tender age of 11. Now over 44 years later, Lawson has been fortunate to make his passion his career and has authored and co-authored over 45 books mainly on our underwater world. He is a founding member of the Marine Conservation Society, founder of the first Marine Reserve at St. Abbs in Scotland, and made photographic history by becoming the first person to be a Fellow of the Royal Photographic Society and Fellow of the British Institute of Professional Photographers solely for underwater photography. For more information, see: Lawsonwood.com ■



THIS PAGE: Scenes of a pod of false killer whales surrounding and escorting their captive, a single dolphin, away from the divers



Sharks can literally be a 'million-dollar' species and a significant economic drive. Because of their low rates of reproduction and late maturity, shark populations have been driven into a global decline due to fishing. Yet our study shows that these animals can contribute far more as a tourism resource than as a catch target.

Sharks 17,000 times more worth alive than dead



PETER SYMES

Sold for consumption the shark is worth around \$108. In this case a shark is worth a stunning 17,000 times more alive than dead. Image shows sharks on a market in Sandakan, Malaysia

For the Pacific island nation of Palau, sharks are worth much more alive than dead. A new study by the Australian Institute of Marine Science (AIMS) has found that one reef shark during its full life is worth \$1.9 million to Palau in tourism revenue. Sold for consumption the shark is worth around \$108. In this case a shark is worth a stunning 17,000 times more alive than dead.

Globally, up to 73 million sharks are killed every year primarily for their fins, which are used in the Asian delicacy shark fin soup. The Pacific Island States have been among the first to recognize the danger of this unsustainable rate of consumption. Some species' populations have fallen by over 90%. Shark finning alone is estimated to have killed an average of 38 million sharks per year between 1996 and 2000.

Million dollar species
"Sharks can literally be a 'million-dollar' species and a

significant economic driver," explained Mark Meekan, principal research scientist at AIMS, in a press release. "Because of their low rates of reproduction and late maturity, shark populations have been driven into a global decline due to fishing. Yet our study shows that these animals can contribute far more as a tourism resource than as a catch target."

In total, the study found that shark tourism brings in \$18 million to the island nation a year (8% of the country's gross domestic product), making each shark worth around \$180,000 annually.

In 2009, Palau declared its waters as a 'shark sanctuary', completely off-limits to shark fishing and finning. Since then it has declared whales, dolphins, and dugongs off-limits as well, making it one of the most progressive marine conservation nations in the world.

A number of other counties and states have followed suit and banned shark finning in their waters or landing shark fins without the bodies. Chile, with the seventh largest fishing fleet in the world is seeing a new bill being introduced in the Senate there, which would see shark finning banned in

Chilean waters. In the United States, Oregon House passed a bill banning shark fin soup in April 2011. In California a bill recently introduced in the would ban the sale and possession of shark fins, including the serving of shark's fin soup. In Hawaii, restaurants have until June 30 to cook or dispose of their fin inventories, and penalties for possession will be severe, with fines of \$5,000 to \$15,000 for a first offense.

"Shark tourism can be a viable economic engine," said Matt Rand, director of Global Shark Conservation for the Pew Environment Group, which commissioned the research. "Overfishing of sharks can have disastrous effects on ocean ecosystems, but this study provides a compelling case that can convince more countries to embrace these animals for their benefit to the ocean and their value to a country's financial well-being."

The study looked solely at a shark's worth for tourism, and not at the economic worth of ecological services provided by sharks. As top predators sharks play a major role in marine ecosystems.

SOURCE: PEW ENVIRONMENT GROUP PRESSRELEASE



photo &
video

Diver
explores
cenote

*“There are no rules
for good photographs,
there are only good
photographs.”
— Ansel Adams*

Text and images by
Matt Weiss and Joseph Tepper

What is Composition? In its most basic definition, composition is the arrangement of elements and their relationship to one another within an image. It is composition—as well as lighting—that is the primary tool with which photographers put themselves into an image and emphasize the subject(s) in the frame. So, it’s important to put your own creative touch on composition. There is no right or wrong to composition—it’s definitely an art, not a science.

That being said, there are a few tried and true fundamentals of composition that are almost guaranteed to make your images more visually pleasing to audiences.



MATT WEISS

Composition

Composition doesn’t just happen Beginning photographers often see a subject they like and just start shooting. While it is often easier just to be a shutterbug, taking the time to think about how the subject would look best in the frame and within its environment can dramatically increase the impact of the image.

This guide is intended to provide you with some basic composition tips that will help improve your images and serve as a starting point from which you can eventually develop your own creative vision. Many of these tips are not only applicable to underwater photography, but can also prove useful in your topside

photography endeavors as well.

When first approaching how to compose a shot, the first thing you must consider is the best way to generally orientate the shot—horizontally (landscape) or vertically (portrait). Be sure to approach every subject with an open mind. Feel free to shoot both portrait

and landscape images of the same subject; sometimes you might surprise yourself and find the orientation that you wouldn’t have originally chosen is better than you thought.

Enough ‘fish butts’ & dorsal fins
When diving we are in a three dimen-





Cuttlefish (left)
Lizardfish (center)
Blenny (right)

Composition

Don't cut off your subject

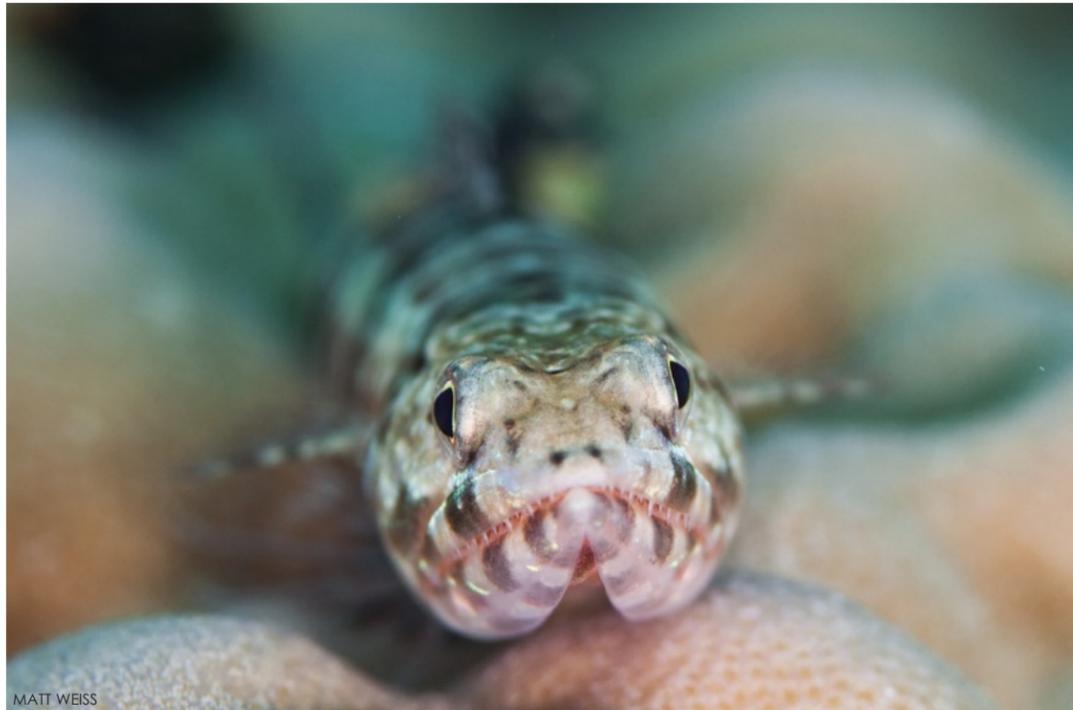
Avoid cutting off parts of your subject with the edges of the frame. Sometimes it is okay to not include the entire subject in the photo- this is usually true for creative macro

Just as we show a lot of expression in our eyes, so do our fishy friends. Therefore, it's only natural for us to be drawn to the eye in an image.

If you are shooting with large apertures or with high magnifi-



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sional world; and when swimming over a reef, we are usually looking down on the life below. Resist the urge to just start shooting the top of the fish. You will usually need to get below the fish, or at least at eye level, in order to make a pleasing image. Therefore, always remember this when composing your shots—"get low and shoot up." No more dorsal fin shots!

Another common mistake is scaring the subject and then chasing after it to get the shot. Fish swim faster than you. You will never catch up. You will end up with "fish butt" shots.

Instead, be patient and take the time to wait until the subject is facing you. As to be discussed later, eyes are the most important part of the subject: a viewer can't relate to a subject without eyes.

shots where the frame is filled with a strategic part of a subject. Cutting off parts of the subject with the frame is best used consciously as a creative tool, like shooting face portraits or eye-shots. However, cutting off part of the subject otherwise meant to be included in its entirety will result in an image that subconsciously reads as being incomplete.

Focus on the eyes

Some people say that the most important rule of wildlife photography is making sure the eyes of the subject are in sharp focus. Out of focus eyes means often results in the loss of your audience's focus.

When using high magnification macro lenses that have shallow depths of fields, it is very important that you ensure sharp focus on the subject's eye. Luckily, eyes usually offer good contrast and auto-focus can pick them up well. By locking the focus on the eye, and then composing your image, you have the best chance of keeping this important feature sharp.

Give fish room to swim

You should always remember to place any subject, or potential subject for that matter, well away from the frame's edge with room "swim into the frame". In other words, there should be more



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Anthia (right)
Diagonal Blenny
(far right)
Turtle and
angelfish
(lower right)

space in front of the swimming fish then behind it. If the moving object is close the edge, it looks like it may "swim" off the edge, which subconsciously makes the viewer uncomfortable.

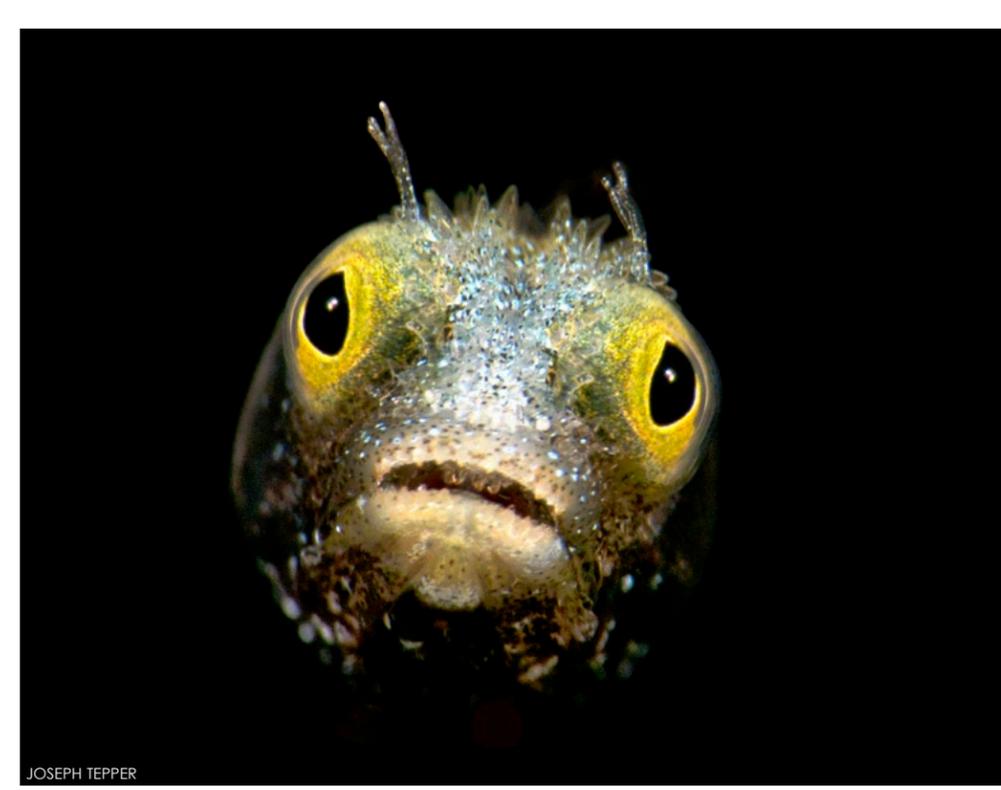
The rule of thirds

—Don't aim for the bulls eye

The rule of thirds might as well be called the golden rule of photographic composition. This rule dictates that an image should be divided up into thirds both horizontally and vertically, and that the important elements of the image should fall on or close to the



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intersections. Aligning key compositional elements of the image with these intersection points will make an image more interesting.

You will notice that most great landscape images have key subject matter offset from the center and do not have the horizon smack dab in the middle, but closer to one of these lines. The rule is mainly applied so photographers avoid placing the main point of interest in the middle of the frame, which is referred to as "bulls eyeing" and will often produce a boring image.

Lines, shapes and colors

Diagonal lines

Adding a diagonal flow to the placement of your subject(s) and/or background, can be one of the major ways to make your images more dynamic and create more interest for the viewer.

Non-diagonal lines

Lines are everywhere in the underwater world; you just have to pay attention. Using these lines effectively can help improve an image's composition.

Different types of lines have different qualities that can change the impact of the image. For example, vertical lines imply strength and power—if you wanted to emphasize the size of something, say, large barrel sponges or massive stalactites, shooting them vertically can help.

Horizontal lines are said to indicate rest or leisure. Shooting a goby resting on coral horizontally may imply that the goby is not moving and perched on the coral.

Leading lines



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Lines are often essential in creating “eye flow”, or in other words, the path the viewer takes when looking at an image. In a well-composed image, the photographer will have dictated where the viewer starts looking at the image and the path their eyes travel across the image using careful composition. The audience’s entering and exiting points when viewing the image should not be arbitrary.

Leading lines are lines that lure the viewer, either through the image or to important features. Often diagonal lines act as leading lines by starting in one corner and leading the viewer’s eye to the



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opposite corner. Try aligning your leading lines with your rule of thirds intersections.

The S-curve

S-curves are an interesting type of leading line. An S-curve need not be strictly an ‘S’ shape, but rather some sort of curved or zigzagged line. The point of the curve is to allow viewers to really get into the image as they follow the line through the frame. S-curves in topside images are often used in peaceful scenes, such as winding streams in the countryside, foot-paths in forests, or fences on farms. The organic shape of the line naturally lends itself to creating “eye-flow”.

Underwater, an s-curve can be almost anything. When shooting macro, you can incorporate s-curves by shooting long subjects such as pipefish or gobies in a curved position, or subjects that naturally curve in multiple directions like seahorses or sea snakes.

When shooting wide angle, you

can use the s-curve similarly to top-side shooters, finding lines within coral formations or among larger animals that pull the viewer in and through the image. Additionally, large schools of fish often form s-curves, and when captured in an image will give the school a sense of order.

Beware of the background

Creating contrast between the foreground and the background is sometimes difficult, but always essential. Failing to do so can lead to the viewer being distracted from the main subject by the unsightly background.

A common situation: you have spotted a rare nudibranch (or other subject of interest) and overcome with excitement you adjust your strobes, focus and fire. You take a quick a look at your LCD screen to review the shot, and notice it’s well exposed but you can’t find the subject. Well, the little guy is hard to find because there are a few different colored

Moray eel (left);
Ornate ghost
pipefish (far
left); S-curve
shark (bottom)

Composition

sponges and soft corals in the background of the image distracting the eye from the subject. As a diver and underwater photographer, if you cannot find a subject on your display screen, it is highly unlikely an untrained eye will be able to.

The human eye can easily distinguish between different elements in nature; however, once photographed, subjects have a tendency to melt into the scene, merging the background with the foreground. Thus, the aforementioned nudibranch stands out to your eye, but not in your image.

Often, subjects are not situated against a good background. The challenge is to figure out a way to create proper contrast between your subject and your background. The most obvious way to eliminate distractions is to change your position or angle. Sometimes we are so excited to

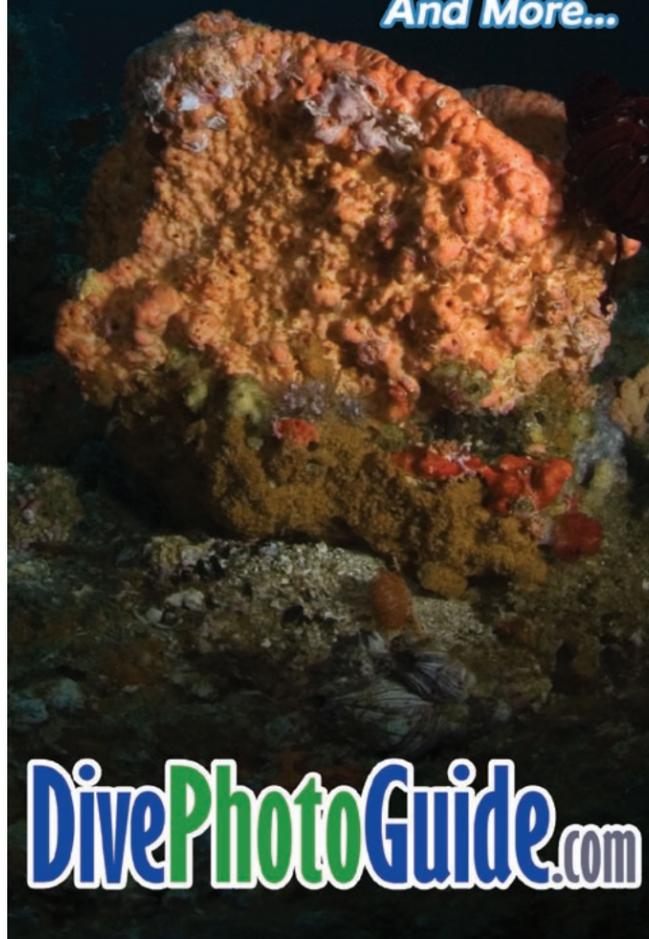


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find a subject that we try and shoot it in whatever way we first approach it. Step back and think —what is in the background and is there a better background from a different position or angle?

Shooting at an upward angle in order get more open water in the frame is a common way photographers remove distracting backgrounds. By minimiz-

ing the amount of "stuff" that is in the frame you add emphasis on the subject. Having more than a few primary points of interest in an image is very distracting.

Tip: If you can't frame the foreground so that it is separated from the background, adjusting your settings may help. Try closing your aperture and increasing your shutter speed, thus

Bokeh
lizardfish (left)
Juvenile
spotted drum (bot-
tom)

decreasing the amount of light that hits the sensor. If you use extreme side or top lighting, you can light up the foreground subject, while minimizing the light in the background, thereby reducing its effect on the image.

Alternatively, you can use a large aperture to blur the background. Sometimes this lets too much light into the background, but an out of focus distracting background can be better than an in focus one. Sometimes if there is a distracting coral in the background, using a larger aperture can blur it out so it's actually an interesting background. This technique is called *bokeh* and is a more advanced technique.

Contrasting colors

Setting your primary subject against a contrasting color is a surefire way to create images that pop off the screen or page! Choosing the color of a background to complement the subject, be it blue or green water, a blacked out background or the colors of another object can make or break an image.

For example, an image of a beautiful red soft coral is more visually striking when taken against a blue background



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of open water rather than against a busy background of the various life forms on a wall. While you may know that the subject was the red coral, it may be hard for your uniformed viewer to tell what the subject is.

Macro photographers often isolate subjects on monochromatic background like plain black or flat blue. A lot of times a colorful macro subject looks good when contrasted with a pure black background.



MATT WEISS

Negative space

Using the negative space—the part of the frame that has no shapes or objects—can become a major element of your composition. In underwater photography

we ordinarily refer to the blue (or green) water or black backgrounds as the negative space.

Of course, good use of negative space implies that the subject is an area in which negative space can be utilized properly.

Given that underwater photographers are shooting wild animals that have not been posed in anyway, this is not always possible. In these cases, you just do the best you can. Just because you spot a subject doesn't necessarily mean it is in proper location to be shot—this can be the most frustrating of all!

Framing your subject

Framing subjects with other objects or with negative space is more challenging, but can yield very pleasing results. A cuttlefish with a black background can be nice, but if you can also light up two nice red sea fans that it's swimming between, the image becomes more interesting. See the whole frame. Think about if it can be improved. Then shoot.



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Composition

Flounder eye (above); Clownfish (top left); Underwater photographer and sea turtle (lower left)

Creating a sense of scale

Wide-angle photographers often utilize objects in the background to increase the appeal of the image. Often a model (another diver) is placed in one of the upper corners of the background, following the rule of thirds, to create depth and show perspective. With just open water in the background, it's impossible to get a sense of the depth. Placing a relatable subject in the background will create perspective. The key here is that we can relate to the size of another human, and use it to get a sense of size and depth in an image.

If you don't have a model off-hand, including another object, like the silhouette of your dive boat, in the background can also achieve similar effects. With patience, an interesting animal like a shark or turtle may swim in the frame in a way that can provide a similar sense of perspective.

Fill the frame

Lastly, if shooting macro you can get in closer to try and fill the frame as much as possible with the subject. Sometimes a close-up portrait is better than a full body shot with a distracting background.

Rules are meant to be broken

These rules are just guidelines. As with every rule, there are always exceptions. Really great composition comes from a photographer's imagination, and truly fantastic images are products of creativity—not a list of rules. Think outside the box, but keep these guidelines in the back of your head when first starting out. Remember, rules were meant to be broken!

For more information about underwater photography, check out the comprehensive Techniques Guide on DivePhotoGuide.com ■



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Fantasea 3D Housing & Camera Package

Fantasea has announced the release of a package containing the Fujifilm FinePix REAL 3D W3 camera and the RecSea WHF-3D W3 polycarbonate housing. The housing was released at DEMA last year, and has a depth rating of 40m, and a fiber optic mounting port. The Fujifilm FinePix W3 features 10 megapixel resolution and is capable of shooting both conventional and 3D stills and video. www.fantasea.com



Equinox Canon 5D Mk II Housing

Equinox has announced the release of a housing for the Canon 5D Mk II camera. Somewhat of a departure from the company's line of video specific housings, this reflects the popularity of the camera for video rather than stills use. The housing is designed around the use of a Canon 16-35mm lens, although other lenses can be accommodated by special request, and it provides access to shutter release, menu button, menu select/scroll and play controls. The housing also features Equinox's ballast release handles, which allow the user to make the housing positively buoyant if some contingency demands it. www.equinoxhousings.com



Panasonic Lumix LX-5

Ikelite's housing series for the excellent Panasonic Lumix LX-5 camera features Ikelite's proprietary conversion circuitry, which allows two-way communication between the camera and Ikelite Substrobes, providing true Panasonic TTL exposure. In addition to providing the most accurate automatic exposure, this ensures a faster recycling time and longer camera battery life as compared to fiber optic TTL systems. All camera controls except the Flash Open Switch are fully functional through the housing and depth rated to 200ft (60m). An included flash diffuser improves lighting quality when the camera's built-in flash is used. A built-in flash is effective between 1-3 feet (0.3-0.9m) from the subject in clear conditions. www.ikelite.com



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Sea & Sea MDX-D7000 housing

Sea & Sea has announced the release of the MDX-D7000 housing for the Nikon D7000 camera. It is machined from a solid block of aluminum, protected by a highly corrosion-resistant coating. Other features include a port lock mechanism, two fiber optic ports and one optional electronic port and a built-in leak sensor. www.seaandsea.com



The River Rhône

Text and photos by Rémi Masson
www.remimasson.com

—Diving in the French river Rhône with
European catfish

The Rhône is a large French river, which is 545km long. It flows from the Alps, across Lake Geneva and joins the Mediterranean Sea. Cloudy in appearance, as if to preserve her secrets, it is difficult to have strong views about this type of river. On one hand, we locals highlight the return of iconic species such as salmon—indicating an improvement in water quality—on the other hand, we denounce the pollution—PCBs (polychlorinated biphenyls)—found in the river. Moreover, because of this pollution, eating fish from this river has been prohibited since 2007.

Diving adventure

For a long time I thought that it was impossible to dive the Rhône River due to the very bad visibility and strong currents. Then one day, after much hesitation, I decided to do a test near the city of Lyon. What I saw that day far exceeded my expectations.

When I explored this new environment, it was as if I entered a sanctuary. I moved slowly, almost blindly, taking a long time to note details, every form, every object.

Initially, the signs of life were rare. Occasionally, there were a few furtive shadows moving in the dark, green water. There was not much detail, not

A long eel hides
among the rocks





CLOCKWISE FROM FAR LEFT: Freshwater sponges; Beautiful fall colors along the River Rhône; A shoal of nases shimmer with sunrays

could see two long whiskers, then a huge head split by a grin. A European catfish of over two meters was now facing me. No sudden movements. He just rubbed against me, while I stood on my knees on the river bed. I dared not move. This behaviour surprised me every time, and I could not always explain it.

When he decided it was time, he went—slowly and gracefully,

much light, but a strange atmosphere. The water was often so hazy that if I held out my arms, it was very difficult to see my fingers. It became a little bit better after a few minutes when my eyes become accustomed to the dark.

The rippling shoreline and shallower parts of the river were by far the most populous. Large shoals of breams, common nases, barbels, crucian carps and perchs were playing hide and seek there, while huge eels slipped silently through the stones.

Some carp were swimming through,

At the bottom of the river, often in less than 50cm of water, I could see zanders sleeping.

There is enormous diversity in large rivers. They bring together, in one place, most of the species of the running waters of the surrounding streams and lakes.

Vegetation as it was, although small, was not necessarily absent and even took many surprising forms, such as large freshwater sponges branching out, attached to the rocks like stag horn coral.

In the quieter areas, there were also the

too, alone or in shoal. It was not uncommon to see a group composed of fishes that belonged to several different species.

long, developing fronds of milfoils, aquatic plants native to Europe, which served as lookout points for pike. The aquatic plants sway in the current like the hair of mermaids.

The lord of the river

Diving deeper down to the river bed was to enter another world—a dark world where the rules were reversed. Here, it was not the diver who came to see the fish, but the fish that came to meet the diver. Carps were very curious and didn't hesitate to approach the diver to try to understand what a strange and clumsy creature a he is. Curiosity satisfied, they continued along their underwater stroll.

But the real lord of the river prowled the diver, too. First, there was a shadow that grew gradually bigger until it became, oftentimes, bigger than me. Suddenly, I



CLOCKWISE FROM ABOVE: Carps of the Rhône River are very curious; Crucian carp in the shallows; Zander sleeping on the river bed



The mystery of the wels catfish gathering

It's also possible to witness some other unusual fish behaviours in the River Rhône. Sometimes the fish gather in certain places to form a compact shoal of several dozens, or hundreds, of individuals. Such groups have already been observed for roach, bream, barbel—and to a

lesser extent—predators such as zander. But the most impressive of all is probably the amazing

gatherings of wels catfish (*Silurus glanis*), with dozens of fish piled up at the bottom of the river. They form a moving ball several meters wide, reminding me of a shoal of common catfish (*Ameiurus melas*).

The reasons for these winter gatherings still remain a mystery. This is why I collaborated with a researcher of the CNRS (Centre National de la Recherche Scientifique) to study and understand the origin of this strange behaviour.

Rivers surprise me with their amazing biodiversity, but there

is still much to learn about them. It's a dark world populated by mermaids and monsters that gradually reveal its secrets.

Rémi Masson is an underwater photographer and dive writer based in Grenay, France. For more information or to order prints, visit: www.remimasson.com

Want to see a catfish as big as a shark? Watch this video: www.youtube.com/watch?v=ZaldhRtYmJM ■

undulating with majesty. This kingdom belonged to him, and he knew it.

Betty Busby



P O R T F O L I O



portfolio

PREVIOUS PAGE:
Fungia, Waterscapes Series, by Betty Busby
Quilt, 42 x 53 inches



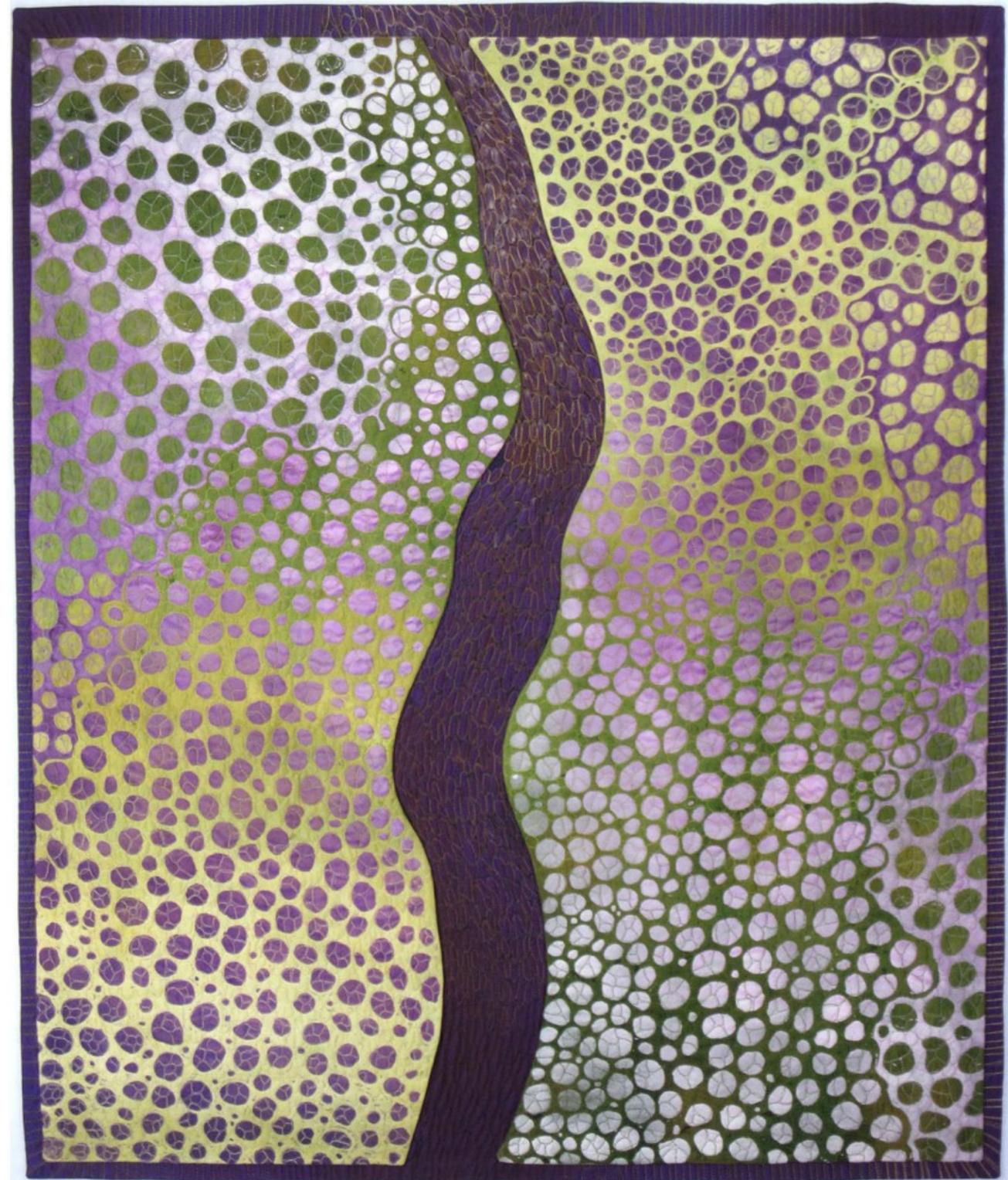
Triggerfish, Waterscapes Series
by Betty Busby. Quilt, 52 x 42 inches

American textile artist, Betty Busby, has captured underwater scenes in a unique and remarkable way on visually stunning quilts exquisitely crafted by hand, bringing fresh contemporary concepts to a centuries old traditional art form. In addition to brilliant, colorful reef scenes, Busby has delved into the microscopic world taking inspiration from the super macro perspective informed by molecular biology of ecosystems above and below the waves. *X-RAY MAG's* Gunild Symes asked the artist to share her insights into art and ecology and how her work speaks to the magic of the underwater world.

Edited by Gunild Symes
All quilts by Betty Busby
All images courtesy of Betty Busby

Tell us about yourself and your work, where you are from and how you've gotten to where you are today.

My father was in the U.S. Navy. I was born in Japan, and we lived in Hawaii, Washington and



Plexus, Macro Series, by Betty Busby. Quilt, 44 x 49 inches

Philadelphia. The ocean was a huge part of my childhood, from the wild breakers in Hawaii to summers at the Jersey shore and the rocky beaches of California.

I moved to the high desert of California in 1994, and although this is a wonderful place to live, I miss the ocean. Creating my own fantasy water scenes helps to keep it close by in spirit.

The macro series comes from my life long fascination with molecular biology, with a physician sister, it's a frequent topic of discussion. I'm constantly exploring new materials and





Urchin II, Macro Series, by Betty Busby. Quilt 28 x 30 inches

techniques to use them. I purchase batiks from Bali, dupioni from India, and silk from China that I paint and acid dye.

Various non-woven spun polyester materials are also used in nearly every piece, as well as an extensive

array of mixed media. I feel that using a large variety of products helps to reflect the incredible diversity found among living things.

My creative process begins with an idea of what I want the piece to be about. I construct the elements

and work in many stages, adding, subtracting, and evaluating along the way.

Tell us about your training and education and how it relates to your artwork. Who, if any, has been



Push, Macro Series, by Betty Busby. Quilt 49 x 41 inches



Busby

Coral Spawn,
Waterscapes Series
by Betty Busby
Quilt, 45 x 18 inches

an inspiration to you artistically speaking, and why or how have they inspired you or mentored you?

I received a Bachelor of Fine Arts degree in Ceramics at the Rhode Island School of Design on the east coast of the States. Jun Kaneko, my senior year professor, was a huge influence on my career. Although our work is very different, it was an amazing example of what you can accomplish by putting art first in your life.

After graduation, I founded and operated a custom ceramic tile manufacturing company in southern California. I ran it for nearly 20 years before selling it to retire to the mountains. That experience has been central to my work in fiber -- the necessity of being able to figure out technical solutions was an every day part of life in the plant.

Are you a scuba diver or a snorkeler? If so, what is your favorite place to dive and what do you like to see underwater?

Snorkeling in Hawaii has been an incredible experience for me. I'm a huge cephalopod fan, I love to see octopi and cuttlefish in their native habitats.

Tell us about your relationship to the underwater world, the sea and the reef. What inspires you about the ocean and the underwater realm?

Maybe because I'm a Pisces, I have always been drawn to water. It represents another world to me of fantastic dimension, color, and variety.

Tell us your thoughts on the role of art in conservation and environmental awareness.

The more the public can be educated about the wonders of the world that they might not

Metaphase,
Macro Series,
by Betty Busby
Quilt, 33 x 41 inches



Busby

Pod, Macro Series,
by Betty Busby.
Quilt, 63 x 39 inches

necessarily see every day, the more they will be willing to protect it.

Why art?

I feel art is a vital part of what it means to be a human being. From the earliest days in the evolution of humans, bone carvings and cave paintings have been found.

What do you want to say with your art?

Every piece, to me, is about communication. I want to express an idea, or convey a feeling.

What future projects do you have planned?

New materials are on order! They will be experimented with and used in new and unique ways.

Where can readers find you online and in exhibitions?

My website is **bbusbyarts.com**. It has updates on shows and events, and a nearly complete catalog of my fiber works.

My store on Etsy.com is bbusbyarts: **www.etsy.com/shop/bbusbyarts**. Items that are for sale are available, depending on exhibition schedules.

I am represented by Gallery 101 Main in Collinsville, Connecticut

Flow, Macro Series,
by Betty Busby.
Quilt, 62 x 42 inches



portfolio



Busby

CLOCKWISE
FROM FAR LEFT:
*Fish Lips, Waterscapes
Series, by Betty Busby.*
Quilt 24 x 43 inches

*Tentacular, Macro
Series, by Betty Busby.*
Quilt 59 x 52 inches

*Betta, Waterscapes
Series, by Betty Busby.*
Quilt 49 x 49 inches

I enjoy keeping fish, the
wet pets join my dogs
and chickens in our small
desert oasis.

For more information
or to purchase artwork
directly from the artist,
visit: www.bbusbyarts.com ■

(USA): Gallery101main.com.
I have a very busy exhibition
schedule in the States and
internationally.

*Do you teach art? If so, what is
your approach?*

I have extensive experience
with children and adults.
Helping each student to find
their own voice while teaching
them about the fundamentals
is my aim.

Particularly with children and
beginners, it is a joy to see the
breakthroughs experienced by
those who never realized their
own potential.

*Anything else you would like
our readers to know?*



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Happy Diving!



KATE CLARK



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— from the staff at X-RAY MAG

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