



GLOBAL EDITION  
March/April 2017  
Number 78

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**Wrecks of Laredo**

Austrian Lakes  
**Grübl & Grüner**

Australia  
**Tasmania**

Dive Medicine  
**Inert Gas  
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Russia  
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Galápagos  
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THE CENTRAL ATOLLS

**Maldives**

COVER PHOTO MIKE BARTICK



# DIRECTORY

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# Disinformation

The Enlightenment was a philosophical movement that took place in Europe and North America, during the late 17th and early 18th centuries. Also known as the Age of Reason, its emphasis on reason and scientific method as the primary source of authority and legitimacy, helped humanity to break free from ignorance and irrationality, and laid the foundations for modern societies and all the many insights and technological advances that are now at our disposal. The Enlightenment also came to advance ideals like liberty, progress, tolerance, fraternity, constitutional government and separation of church and state—principles we have since held in the highest esteem in most Western societies. Well, some of us.

But what does that have to do with diving?

I would like to think that we would continue to rely on these sound and successful principles as we go about caring for our environment and the challenges we face in this regard, using an informed and rational manner, and using our (scientific) insights to make optimal and timely decisions on how to best protect our natural resources and wildlife—also for future generations.

It has thus been deeply disturbing to witness how this whole issue—in particular, the matter of anthropogenic global warm-

ing—has become politicized to the point where the scientific community has been denigrated, by some, and even cast as some kind of secret subversive society colluding to make life more difficult for good citizens. As ridiculous as this whole notion comes across, it has, sadly, had some success, and apparently, has found its way even into some of the highest offices of public administration.

The truth we seek is, however, objective, and not a matter of beliefs or political expediency. Facts are facts, regardless of whether we find them inconvenient. The scientific method is an *objective* inquiry based on empirical or measurable evidence, subject to specific principles of reasoning. Or as one scholar put it, the scientific method is the best way yet discovered for winnowing the truth from lies and delusion.

As we go through life, we seek the advice of qualified professionals, some of whom are scientists, to obtain the best possible information or advice before we make a decision on important matters. We trust that our doctors and dentists are properly trained, that our accountants know tax laws, that engineers are able to build bridges that will not collapse, and pilots and captains have the required competence to get us safely from point A to B, and so on. Why is it then, that a large proportion of the population continues to believe that

climate change is some sort of construct, or even conspiracy, in the face of overwhelming scientific evidence?

A while back, I got immersed in a debate about climate change, and in the process, it came to light how some entities purporting to be scientific bodies holding “alternative views” (i.e. the so-called “Heartland Institute”) were really just marketing fronts and lobbyists paid by the oil industry to muddy the waters and cast doubts on the findings of the established scientific community. This was not about an honest scientific discourse, but a nefarious attempt to discredit renowned scientists and delay the inescapable conclusions and necessary remedies, solely for the gain of select interests and surely not the common good.

Finding the solution to a problem rests on a proper diagnosis and qualified analysis. Let scientists do what they are trained to do and without undue political interference—from either side of the aisle—and we might just stand a chance of fixing the issues we all are facing.

We need to remain...  
Enlightened.

— Peter Symes  
Publisher and  
Editor-in-chief







News edited  
by Peter Symes

*from the deep*  
**NEWS**



BRANDI MUELLER

# How to save the ocean

— *Using it without using it up*

**Employ incentive-based solutions for a strong, lasting “blue economy”, a marine ecologist suggests.**

In order to address the many environmental challenges that the world's oceans face today, a leading marine

ecologist from Oregon State University College of Science shared lessons from around the world.

In her presentation in Boston at the annual meeting of the American Association for the Advancement of Science in February, distinguished professor Jane Lubchenco said: "If we harness human ingenuity and recog-

nize that a healthy ocean is essential for long-term prosperity, we can tackle the enormous threats facing the ocean, and we can make a transition from vicious cycles to virtuous cycles."

### Importance of oceans

In many nations around the world, leaders are looking to the seas for new

economic opportunities, food security and alleviation of poverty. Lubchenco's presentation entitled "Getting Incentives Right for Sustained Blue Growth: Science and Opportunities," which was co-authored by Elizabeth Cerny-Chipman, a Knauss Fellow at the National Oceanic and Atmospheric Administration (NOAA), addressed the balance needed in short and long-term economic incentives to achieve a mix of benefits, without depleting the oceans.

As a main source of protein production for three billion people, the world's oceans are under enormous pressure. Researchers also note that work related to the seas employs over 200 million people and contributes US\$270 billion to the world's gross domestic product.

### Blue growth

Blue growth means sustainable growth in the marine and maritime sectors, through long-term strategies. "The right incentives can drive behavior that aligns with both desired environmental outcomes and desirable social outcomes," said Lubchenco.

### Key steps

The first step, said Lubchenco, in building more support for sustainable blue growth is pointing out its potential. This means working with leaders in government, industry and communities to foster "win-win solutions", with short-term economic and environmental benefits.

It is also a key step to transform "the social norms that drive the behavior" in various sectors, especially in industry, said Lubchenco. And lastly, there needs to be "a cross-sector approach", she said.

"Some nations, like the Seychelles, Belize and South Africa, are doing integrated, smart planning to deconflict use by different sectors while also growing their economies in ways that value the health of the ocean, which is essential to jobs and food security," said Lubchenco. "They are figuring out how to be smarter about ocean uses, not just to use the ocean more intensively."

■ SOURCE: EUREKALERT

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## Diverse line-up of speakers to be featured at The Blue Wild's ten-year anniversary

A veritable who's who of speakers from the diving and water-sports world will be giving presentations, demonstrations and seminars at this year's Blue Wild Ocean Adventure Expo at the Greater Fort Lauderdale/Broward County Convention Center in Fort Lauderdale, Florida, USA, April 22-23, including two contributors from *X-Ray Mag*.

In addition to 17 celebrity speakers and experts covering topics in adventure travel, scuba, dive medicine, ocean conservation, freediving, fishing, underwater photography and videography, there will be hands-on workshops in marine art printmaking, video editing, yoga and lionfish preparation.

Kicking off the event is The Blue Wild

show host and producer, Sheri Daye, who said: "I'm thrilled to be celebrating our tenth anniversary this year. We strive to offer an exciting atmosphere where like-minded ocean lovers and watersport enthusiasts of all ages can meet up and socialize," she said. "I've crafted the expo to be both educational and entertaining, where attendees can learn about latest techniques and products, shop for great deals, listen to the best speakers and network with one another."

Speakers include filmmaker Frazier Nivens who won the National Association of Television Arts and Sciences Emmy award for excellence in programming for his work, "Sharks, Killers of the Caribbean," and founded Ocean Imaging Videography Productions; Italian freediving champ, yoga instructor and author Federico Mana; US Navy diver, research and instructor Robert Croft, the first person to freedive beyond 200 feet; US Coast Guard pilots and rescue swimmers; US Freediving national record holder, instructor and safety advocate Ted Harty; University of South Florida resident



Author and underwater photographer Jennifer Idol

physician, safety advocate and inventor Dr William Pearce; underwater photographer, researcher and TV personality Chris Gillette; marine biologist Shana Phelan who works in sea turtle research; and adventurer Manny Puig who educates and entertains visitors with tales of his interaction and dives with sharks and alligators.

Two contributors from *X-Ray Mag* will also be presenters at the show. Underwater photographer Jennifer Idol is the author of *An American Immersion*, a new book that describes her journey as the first woman to dive all 50 states, highlighting the plight and

conservation of local waters. She will speak about local diving treasures throughout the United States.

Florida transplant, artist and printmaker Patricia Knight will give a demonstration and talk about ocean art and conservation. After discovering printmaking in graduate school, she began using her photographs from her diving as a basis for her prints. As an art teacher, she encourages appreciation and conservation of the local environment and sea life.

### About the expo

The Blue Wild expo began as a small charity event and has evolved over the past ten years into an annual two-day show hosting 160 exhibitors, covering 65,000 sq ft and anticipating 5,000 attendees. There will be several returning exhibitors, including Aqua Lung, Mares,

Cressi, SEAC, PADI, Pelagic, Bass Pro, YETI, Florida Freedivers, Island Water Sports, Nautical Ventures; as well as several new exhibitors, including NAUI, Coco View Resort and Reef Photo & Video. There will also be state-of-the-art water toys, kayaks and Contender Boats on display. Ocean art fans will enjoy one of the most impressive collections of local and world-renowned artists including Carey Chen, Don Ray, Randall Scott, Jason Mathias, and many more.

Known for its fun vibe and high-energy crowds, the Blue Wild Ocean Adventure Expo draws a diverse crowd, including visitors, experts and exhibitors from all over the world who come to Fort Lauderdale for its central location, year-round tropical weather and warm waters. Tickets are \$20 at the door and include a free goodie bag (while supplies last) as well as free entry to the Saturday night After-Party in nearby Fort Lauderdale Beach Courtyard Marriott. For more information, visit [TheBlueWild.com](http://TheBlueWild.com) or check out a video from last year: <https://youtu.be/l-a2kXyejIQ>. ■

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



Emmy award-winning filmmaker Frazier Nivens



Marine artist and printmaker Patricia Knight



## Know Your Gear

In May, an international event in Kuala Lumpur will focus on how to get the most out of your scuba equipment and underwater camera gear. The Asia Dive Conference will feature occupational diving and safety expert William Ong of Singapore and several other key presenters.

Photos courtesy of ADCON

In the beginning, all of us divers learn how to breathe through our regulators during our open water dive certification courses. But how well do we really know our regulators? And those of us who are also underwater photographers learn the basics of how to shoot marine life, waiting for just the right moment to get the best shot. But how expert are we in the care and maintenance of our camera gear?

This year, there is an international conference focused upon these very



Ahmat Najah Rahmat, SDI and RAID Instructor Trainer and Cressi distributor



Y.K. Sim, owner of Rainbow Runner and Mares Regulator Technician Instructor

issues. Sporting the theme: "Know your diving regulator," the Asia Dive Conference (ADCON) will take place in the Malaysian capital of Kuala Lumpur, 13-14 May. Key presenters will impart in-depth knowledge of products from participating manufacturers, including Mares, Poseidon, Oceanic, Hollis, Cressi-Sub, Tsumani, Big Blue and Inon.

### Hands-on

Bring your gear and be ready to learn about the importance of maintenance



William Ong, ITDA Regional Director and Dive Scuba Technician Trainer

and service of dive and underwater camera equipment, as experts cover the technology, performance, mechanics and functions of equipment.

### Experts

Keynote speaker and Dive Scuba Technician Trainer, William Ong, will elaborate on how to evaluate and calibrate your open circuit system.



Nurul Azlifah, PADI Instructor, underwater photographer, and owner of Urban Island Divers Pulau Perhentian dive center



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information and gain insights into the inner workings of their equipment. Participants are encouraged to bring their own regulators, cameras and lenses during the conference workshops in order to get the most out of the valuable knowledge and education pro-

vided by experts in the field. Get tips on how enhance your knowledge and improve your skills and proficiency in handling and maintaining dive gear and underwater camera equipment, learning when to send it to an authorized service center. Participants who complete the session with William Ong will receive a certificate of recognition in the SCUBA Technician Foundation Level, with competency to evaluate and calibrate their own equipment.

### Registration

Space is limited to 30 people for the 3.5-hour session, "Evaluate and Calibrate" with William Ong, so register soon. Don't miss out on this unique opportunity to learn from an expert! Go to: [Adcon.com.my](http://Adcon.com.my). ■



Raja Razis, PADI Scuba Instructor and founder of Downtown Scuba Partner at Oceanic Photolab

vided by experts in the field. Get tips on how enhance your knowledge and improve your skills and proficiency in handling and maintaining dive gear and underwater camera equipment, learning when to send it to an authorized service center.

Participants who complete



Takuya Torii, INON corporate messenger and underwater photographer trainee, will present an Introduction of Underwater Photography



Michael Lim, documentary film producer and founder of the first technical diving center in Singapore

Other speakers will also conduct practical demonstrations of their product brands during the two-day event. Participants will get hands-on experience and engage in practical exercises to increase their own skills with equipment. They will also learn how to pre-check their scuba and camera equipment before every dive to determine if it is due for service.

### Tips

Lectures in theory will be given before each session, so participants can assimilate technical

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## ASIA DIVE CONFERENCE

DIVE INTO POSSIBILITIES

Photo by: Peter Symes

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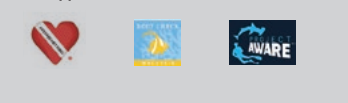


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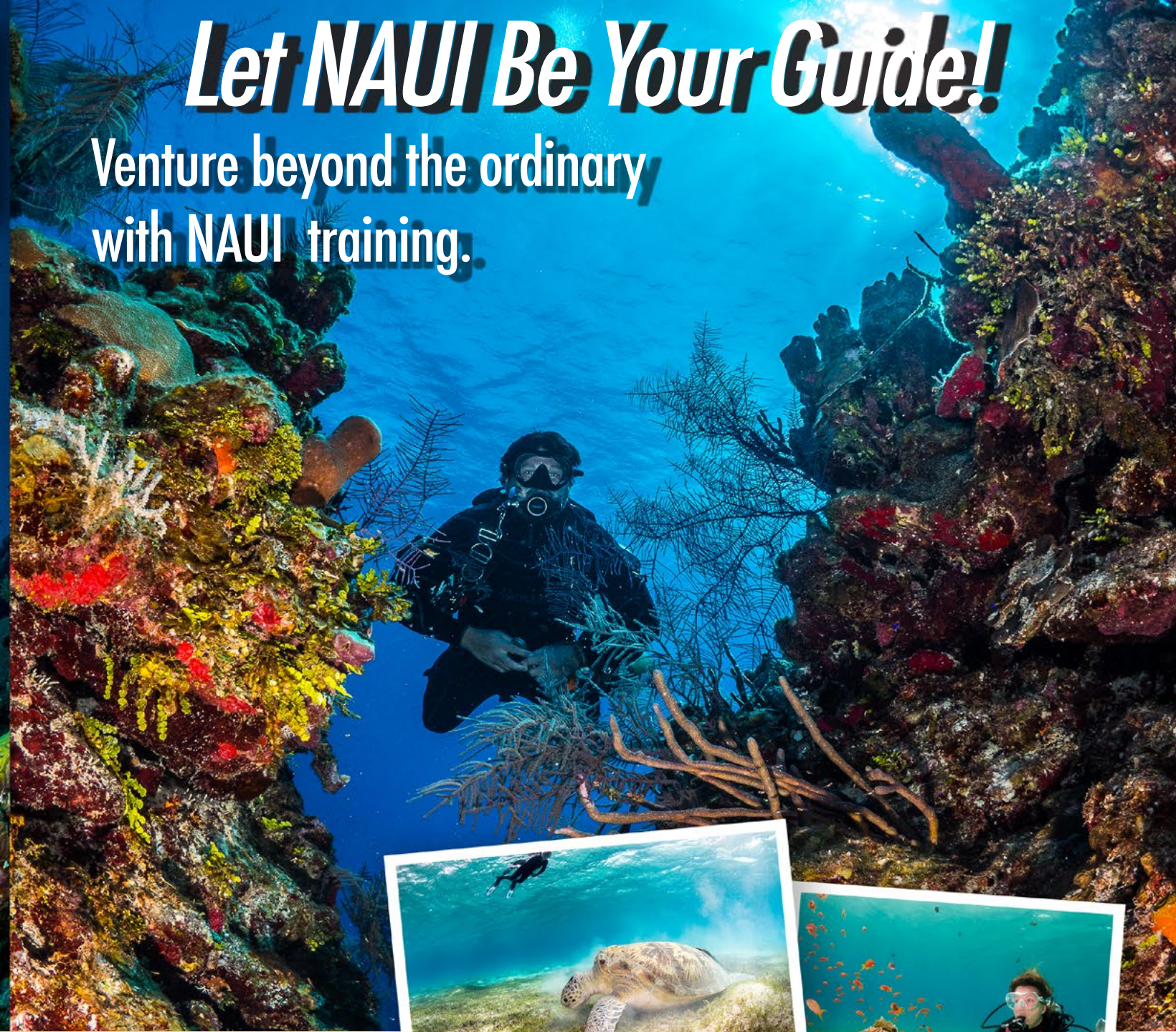


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wreck  
rap



Edited by  
Peter Symes



# IANTD expedition celebrates 100th anniversary of RNR Margherita wreck

PHOTO COURTESY OF IANTD

**Back in Albanian waters 11 years after the first expedition to the wreck of the Regia Nave Regina Margherita, IANTD—the International Association of Nitrox and Technical Divers—undertook another expedition to the wreck to commemorate the 100 years that have passed since the ship sank on 11 December 1916.**

It was a stormy night when the Italian battleship hit two mines and

disappeared mysteriously, close to the mouth of the bay of Valona in Albania, in between Punta Linguetta and Saseno Island. Six hundred seventy-four crew members were lost that night, and the impact of the tragedy was felt high up in the Italian Royal Navy leadership and affected the Italian naval war strategy. While Italian commanders suspected accidental contact with a mine in a minefield, members of the Austro-Hungarian Navy credited the sinking to German mine-laying submarine UC-14. But, historically, the mysterious circumstances of the vessel's demise were never entirely clarified, because the Austrian secret service

also claimed that their own saboteurs were responsible for the event.

## The expedition

The importance of the anniversary of the RNR *Margherita* shipwreck led to discussions with Albanian authorities, including the Ministry of Culture, for organizing an official IANTD expedition to the wreck, which took place on 8-11 December 2016. Dives to the battleship (which weighed 13,427 tons and measured more than 138m in length), were conducted by IANTD instructors and divers, with advanced diving skills and expertise in trimix and nitrox gas mixtures.

The team included expedition

leader, Cesare Balzi; deputy expedition leader, Massimiliano Canossa; underwater photographer Michele Favaron; photographer Haxhij Beni; underwater cameraman Edoardo Pavia; underwater photographer Mauro Pazzi; organization manager and president of the Albanian Divers Federation, Igli Pustina.

The expedition activities were supervised by archaeologists Meshini Mariglen, representative of the Archaeological Service Agency of Tirana; and Kriedian Cipa, representative of the South Regional Directorate of National Cultures of Vlora. A wreath was laid on the wreck site by IANTD and a representative



PHOTO COURTESY OF IANTD

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from the Albanian Ministry of Culture, in remembrance of those who lost their lives.

Included in the expedition was a dive to the wreck of *Andromeda*, an Italian torpedo boat that sank in the eastern waters of the Karaburun Peninsula during WWII on the night of 16 March 1941. Further underwater footage was also taken of the hospital ship, *Po*, sunk by British torpedo-bombers on 14 March 1941.

The project was supported by several organizations, including Aquamarina, Marina di Pisa, Acquelibere Sub, Padova; Nautica Mare Dive, Verona; Sea Dweller Divers, Roma and Sub Delphinus, Ravenna. In addition, the Nardi company provided a portable compressor and other useful logistics. ■

SOURCE: IANTD



Historical photo of Regia Nave Regina Margherita

PHOTO COURTESY OF IANTD







# 17th century warship wreck found in Sweden

PHOTO COURTESY OF THE SWEDISH NATIONAL MARITIME MUSEUMS

The wreck of a 300-year-old warship has been discovered by marine archaeologists in Sweden. The vessel, thought to be the *Blekinge*, was found near the naval port of Karlskrona. The ship played a role in sea battles against Denmark and Russia in the late 1600s.

The naval base of Karlskrona was built by the Swedish king, Charles XI, after the Scanian War of 1675-1679 against Denmark, in case of future conflicts.

Jim Hansson, curator of archaeology at the Swedish National Maritime Museums told IBTimes UK: "After the war, the king decided to build a new naval base that would be easy to pro-

tect in open sea and this is in the south of Sweden, not far from Denmark that they settled. The Karlskrona Naval Base was one of the largest ever constructed and it remains in use today."

Hansson and his team of marine archaeologists found the ancient shipwreck in December 2016, after the Swedish Navy had indicated that a wreck could be located just outside the harbor of Karlskrona. Historical maps used in the planning of the naval base construction were also used by researchers to help locate the wreck.

The discovery is significant because *Blekinge* is thought to be the first ship built in the shipyard of Karlskrona. Constructed in 1682, *Blekinge* was part of a fleet that fought the Danes and Russians in the Great Northern War in the beginning of the 18th century, which led to the end of the Swedish



PHOTO COURTESY OF THE SWEDISH NATIONAL MARITIME MUSEUMS

Empire and the rise of Russia as a dominant power.

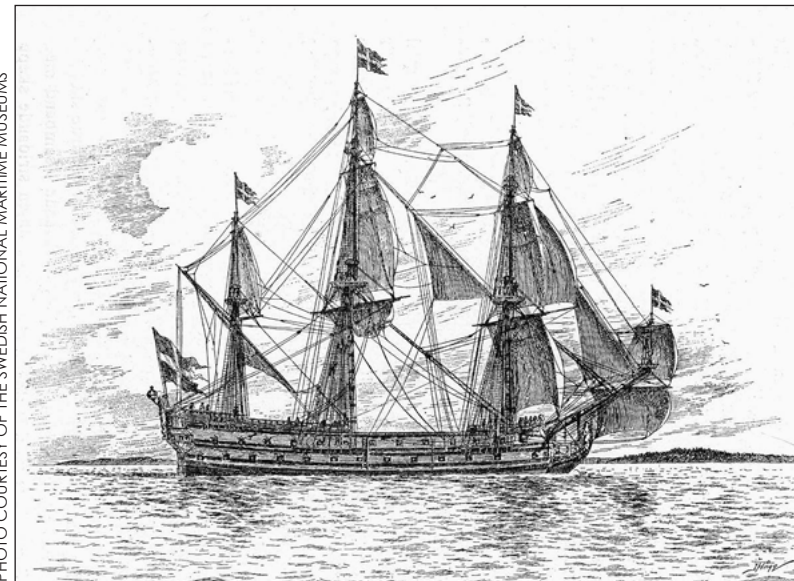
It is thought that *Blekinge* is similar to *Vasa*, another 17th century shipwreck located in the 1950s outside Stockholm harbor, with a largely intact hull salvaged in 1961, now housed in a purpose-built museum in Stockholm. Researchers believe *Blekinge* to be around 45m (153ft) in length and could have carried up to 70 canons. Historical evidence indicates the ship

sank in 1713, but it is not known whether it sank by accident or it was sunk intentionally.

Hansson said: "During the war with Russia and Denmark, the economic situation in Sweden was dire. Construction of the base at Karlskrona had to stop. My hypothesis is that the ship was downed on purpose so that its canons could be used on a sort of canon barge, to defend Karlskrona."

■ SOURCE: IBTIMES UK

PHOTO COURTESY OF THE SWEDISH NATIONAL MARITIME MUSEUMS



Historical illustration of Blekinge



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## Tourists to be allowed on Franklin wreck

**New this year: Tourists will be invited to glimpse the Franklin expedition shipwreck, HMS Erebus, in Nunavut.**

In partnership with Parks Canada and the Interim Franklin Advisory Committee, an Ontario-based tour company, Adventure Canada,

announced that one of its cruise ships will stop at the wreck site of HMS Erebus during its "Out of the Northwest Passage" expedition cruise, scheduled for this fall. During the trip, passengers may get an opportunity to snorkel over the shallow waters of the Erebus wreck. It will be the first time tourists will get a peek at the ship since it was discovered in 2014.

### History

The Erebus was one of two ships lost during a 19th century British voyage to explore the Arctic led by Captain Sir John Franklin, a Royal Navy officer and explorer who had already undertaken three previous expeditions. But his fourth proved to be his last, when, at age 59, he set out to cross the last uncharted part of the Northwest Passage only to become icebound in the Canadian Arctic, at Victoria Strait, close to King William Island. The entire expedition, including Franklin and 129 crew members, was lost.<sup>1</sup>

### The expedition cruise

In September 2017, the first of two expedition cruises will offer "the HMS Erebus experience" as part of the 150th anniversary of Confederation, which, in 1867, united three British colonies to form one Canadian dominion.<sup>2</sup> On the cruise, Inuit guides and experts from Parks Canada will give insights into some of the nation's most remote national parks such as Qausuittuq,

<sup>1</sup> WIKIPEDIA.ORG/WIKI/FRANKLIN'S\_LOST\_EXPEDITION

<sup>2</sup> EN.WIKIPEDIA.ORG/WIKI/CANADIAN\_CONFEDERATION

Sirmilik and Auyuituq, as well as historic sites such as the HMS Erebus wreck. On 7 September, this Canadian Signature Experience, dubbed the "Out of the Northwest Passage" expedition, will sail from Kugluktuk, Nunavut, to Kangerlussuaq, Greenland.

Minister of Environment and Climate Change and Minister responsible for Parks Canada, Catherine McKenna, said: "This opportunity to experience the wreck site of HMS Erebus offers a unique and meaningful way for Canadians and international travelers to discover our northern environment and heritage. It's also a great way for visitors to learn more about Inuit history and culture and the significant contributions of Inuit knowledge to the story of the lost Franklin Expedition. I hope to see more partnerships like this, which will support northern communities through employment opportunities and community development, and showcase the wonders of the Canadian north." ■

SOURCE: PARKS CANADA, NUNATSIAQ NEWS



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Edited by  
Peter Symes

Northern Sinai coastline with resorts looks quiet and serene in this file photo taken a few years back. Now, this sector is deemed completely off-limits for Western tourists due to the significant increase in criminal activity and continued terrorist attacks on police and security forces.



## Egypt travel warnings eased, but caution still advised

**On 31 October 2015, a flight from Sharm el Sheikh to St Petersburg crashed in North Sinai. Egyptian and Russian authorities are conducting an investigation, which has not yet formally concluded, but the aircraft is widely believed to have been downed by an improvised explosive device placed aboard the aircraft at Sharm el Sheikh International Airport. Airlines of a number of countries ceased flights to and from Sharm el Sheikh following the incident, while reviewing security arrangements. The resort town of Sharm el Sheikh itself has generally been deemed to be safe all along, but European officials were not happy with security standards at the airport.**

Egypt has since spent over US\$20 million on improving airport security standards, which are now believed to be higher than in many African countries. As a consequence, most countries, except the United Kingdom and Russia, have

since lifted their bans on flights to Sharm el Sheikh, but various travel advice still imposed a number of restrictions.

**US advice.** The US Department of State warned US citizens of threats from terrorist groups in the region and to consider the risks of travel to the country. US citizens should avoid the Western Desert and the Sinai Peninsula outside the beach resort of Sharm El-Sheikh and only travel to Sharm El-Sheikh by air.

**UK advice.** Meanwhile, the UK Foreign and Commonwealth Office (FCO) advised against all but essential travel to the Governorate of South Sinai, with the exception of the area within the Sharm el Sheikh perimeter barrier, which includes the airport and the areas of Sharm el Maya, Hadaba, Naama Bay, Sharks Bay and Nabq.

However, in direct contrast to the US advice, FCO advised against all but essential travel by air to or from Sharm el Sheikh. So, for British citizens to visit Sharm el Sheikh without transgressing Foreign Office advice, one can fly to Hurghada on the west side of the Red Sea and take the ferry across

to Sharm el Sheikh. As it is much less of a bother for Brits to fly in and out of Sharm el Sheikh using other airlines, i.e. Turkish Airlines and Pegasus via Istanbul, and Egyptair via Cairo, a consequence of the government advice is travel insurance will not be valid for the actual journey through the airport, but it will apply once the travelers are on the ground.

**Canadian advice.** Global Affairs Canada also strongly advised that tourists arrive and depart by air and advised against non-essential travel to Egypt due to the unpredictable security situation. This advisory did not apply to the Red

Sea coastal resorts of Hurghada (and its surroundings) and Sharm el-Sheikh, nor to the area from Luxor to Aswan along the upper Nile, although a high degree of caution should be exercised. It was also recommended that trips be booked through a reputable Egyptian travel company or agency, as they are well informed of the security situation and can better plan accordingly.

**Australian advice.** The Australian government asked its citizens to "reconsider your need to travel" to South Sinai, warning that tourists, tourist infrastructure and religious sites in South Sinai remain an

attractive target for extremists. Tourists are strongly encouraged to avoid unnecessary road travel outside of the resort areas.

**Irish advice.** Irish citizens were likewise advised, if travelling to the Red Sea coastal resorts of Sharm El Sheikh and other Red Sea resorts outside the Sinai peninsula to arrive by air and avoid travelling outside the resort areas.

**French advice.** The French foreign service seemed to be less strict, as travel to the resorts on the eastern coast of Sinai all the way up to Taba was permissible but only by day and as long as instructions by local authorities were followed.

**Danish advice.** The Danish Ministry of Foreign Affairs also excluded not just Sharm el-Sheikh but also Dahab and St. Catherine from the general advice against all but essential travel to Southern Sinai.

### Visa hike adding insult to injury?

Whether the gradual easing of warnings and restrictions is enough to entice tourists back to these once immensely popular resorts, or whether long-term damage has been inflicted on the Egyptian tourism industry, is another question. That the Egyptian Tourism Ministry has, coincidentally, decided to hike up fees for visas from US\$25 to \$60, effective from 1 July 2017—an added cost of \$140 for, say, a family of four—is probably not going to be helpful either. According to a statement issued via the news agency MENA, the ministry reviewed the cost of visas for Egyptian citizens visiting the United Kingdom, Europe and America and found them to be substantially more than visas for Egypt and wanted to bring their fees in line with those of other countries.







# What exactly is meant by "Rebreather Friendly"?

Text and photos by Pete Mesley

**“Rebreather Friendly” dive centres—what exactly does this mean? With emerging technologies becoming more mainstream in the diving world these days, more and more people are making the investment in rebreathers. Everyone knows the advantages of these pieces of kit—extended dive time capabilities, reduced gas usage, quieter and less obtrusive to the aquatic world, etc. But are dive operators thinking on the same lines? Do they see the potential of increased business opportunities?**

With the advent of PADI's recreational closed circuit rebreather (CCR) dive programmes announced in late 2011, it was anticipated that there would be a tidal wave of interest by the diving public learning on rebreathers to capitalise on the advantages of rebreather diving, and dive shops would be able to offer rebreather training and fully-supported CCR operations to their clients.

It turned out not to be such an easy thing. To be able to properly support a CCR diver, a dive store would need to invest heavily not only in plant gear (O<sub>2</sub> gas boosters, blending panels, Sofnolime, CCR tanks, etc) but also have to increase their staff training levels, anticipate higher risk in accommodating rebreather divers (rebreather diver fatality statistics were really high for the first 12 years of their entry into the main diving arena) and also change their diving model. Why would a dive store want to accommodate

higher risk, higher maintenance divers wanting to spend longer time in the water, be guided by rebreather dive guides, which would increase the dive stores costs?

### Six years on...

Now that the dust is fully settled, just how easy is it to plan a dive holiday where you can take your rebreather? Recently, I tried to organise a trip to a tropical location. One of the things that I have learnt when corresponding with dive stores in different countries is, what they say and what actually happens are two different things.

I contacted a dive store (whose name is irrelevant because I have come across the same circumstances in many other shops) and enquired about diving with them on my rebreather. They said that this was not a problem, and stated on their website that they were “Rebreather Friendly”. When I inquired

a little more, I learnt that they did not have any oxygen (apart from medical emergency O<sub>2</sub>), nor any Sofnolime, nor had any CCR tanks,

AND all dives would be limited to one hour. So I was a little confused.

This was not exactly the “rebreather friendly” I had in mind. What they meant was unknown. Maybe a rebreather had come to dive with them in the past, brought all his or her own gear and dived within the parameters of the dive centre's boat. So, I guess the store thought that they were “Rebreather Friendly”, but that is where it stopped. I ended up not diving with that operator nor heading to that destination. With increases in rebreather diver numbers globally, this is becoming an all too familiar situation.

On another occasion, a dive operator responded that they would gladly accommodate my group on rebreathers with longer dive times, but I would have to charter the dive boat with a group booking. On top of that, I would have to bring all my own gear, CCR and stage tanks as well as arrange my


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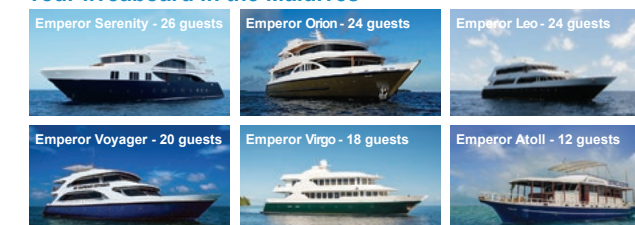
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own consumables (O<sub>2</sub> and Sorb). So I guess this was accommodating us... in a way.

### So what happens now?

Should dive stores make the investment to entice rebreather divers? Sounds great, but then why would they want a group of high maintenance divers who need more gear than most, want more time in the water, need the dive guides to be able to spend longer periods in the water and at greater risk?

Make no mistake, the numbers of advanced and technical divers is increasing globally. This increase in numbers will put more pressure on dive operators. But then again, the majority of the dive market is made up of recreational "holiday divers" who will do 10-20 dives a year, while on vacation.

Their wants and needs are minimal. Everyone is happy if they do a 35-45 minute dive following a guide pointing out a few fish. Operators know this and have embraced it by offering two-tank dives in the morning and then a new group doing a two-tank dive in the afternoon. Everyone will rent their gear. Their staff all know how the gear works. Its SIMPLE, it WORKS, why change it?

What is good to see is that it is not all doom and gloom for the rebreather diver. There are dive operators (slowly emerging, scattered round the world) who have bitten the bullet by offering proper rebreather support and making it part of their mission to offer special-

ised, experienced diver diving products, which encompass all the advantages of rebreather diving.

It is anticipated (and also proven over time) that CCR diving will always be a niche market and not for the masses (recreational holiday divers). Dive operators who have embraced this technology will grow, but at the same time, the majority of the recreational dive market will keep doing what they have been doing. Maybe operators will change their minds if more pressure is put on them by customers (you). It is much like the chicken and the egg scenario!



### Definition

So what is my definition of "Rebreather Friendly"? Here are some thoughts. I think if an operation offers the following basic products and services, they would be well on their way to supporting CCR divers.

- Keep a range of CCR dive cylinders for hire (most CCRs use 3-litre Fabre steel cylinders) and some use the smaller 2-litre Fabre cylinders.
- Be able to offer high pressure oxygen fills. It is not essential to have a booster pump, but high pressure O<sub>2</sub> is a must (decanting is another option, but higher numbers of O<sub>2</sub> tanks are needed for this).
- Keep personnel trained to handle high pressures of O<sub>2</sub> (this is essential for any operation to keep safe and minimise problems).
- Offer Sofnolime fills and have a minimal stock level of sorb.
- Be able to accommodate CCR divers on any charter, on any given day.
- Be able to be flexible enough to offer longer dives for CCR divers. It is not difficult to plan to get CCR divers into the water first, and even if they do 90-minute dives, the single tank recreational divers can take part of their surface

interval at the same site.

- It is preferably (but not essential) to have dive guides on CCR. This would be the most challenging of requirements. As long as the CCR divers are suitably experienced and get a detailed dive briefing, CCR divers (most of the time) do not need guiding. If CCR divers want a guide, then it will fall under normal diving times and requirements, unless previously arranged, and additional charges will incur.
- Keep a supply of stage bailout tanks available for hire: 5-litre (40cf) tanks are the norm (most just require stage rigging and people can use AL80s, if need be, which are in plentiful supply in any dive operation).
- There is no need to keep spares for CCRs or other consumables (O<sub>2</sub> cells, batteries, etc), but it would be nice. These are the things that CCR divers can easily take with them, to be as self sufficient as possible.

All in all, it is a mindset for operators to get on board and support CCR diving. I think that it is likely only a few operators will ever embrace rebreather diving in their businesses—unless their clients put a lot of pressure on them to change. ■



## Rebreather Meeting 4-7 May 2017 Ponza Island, Italy

The fifth edition of the annual Rebreather Meeting will be held on Ponza Island, located in the Mediterranean Sea off the Italian mainland. Enjoy good diving, good food and presentations from leading researchers and technical divers, as well as a chance to do a try-dive with some new equipment. In addition, DAN Europe will set up a medical research station. Package deals include transfers from Rome.

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- Alessandro Marroni** – President of DAN Europe
- Gabriele Paparo** – CCR Divers
- Claudio Carnello** – on technical SIAD gas
- Matteo Amadori** – of MPS Technology will talk about gas boosters

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# In-Water Recompression

*Risk vs. Reward*

Text and photos courtesy of Divers Alert Network

**When traveling to the most remote dive destinations, those left entirely untouched by the machinations of civilization, dealing with the potential for injury without the possibility of adequate medical treatment for days can become a source of anxiety and concern. In isolated locations without the industry or population required to support medical facilities equipped to deal with dive related emergencies, in-water recompression (IWR) becomes an attractive prospect for dealing with decompression sickness (DCS), and a hotly debated issue.**

Used to treat divers immediately after DCS symptom onset in remote locations, in-water recompression involves re-submerging an injured diver in the hopes of driving gas bubbles back into solution to reduce symptoms, then bringing the diver to the surface slowly enough to allow for orderly elimination of excess gas. The practice involves serious risks, and potential complications of the process may outweigh the benefits, but for those divers

attempting expeditions with aggressive dive profiles in the most remote of locations, a discussion of all available options can become necessary.

## The process

Depending on the specific protocols used, recompression in the field is performed at a depth of six or nine meters, and can last for several hours. Divers are generally submerged immediately after symptom presentation, and monitored by attendants who are with them in the water during the entire procedure. A good practice is to begin oxygen administration on the surface while the preparation for IWR is ongoing. Divers whose condition improves with oxygen administration on the surface may not need IWR. The use of full-face masks or hard hats with communication capability is frequently recommended, so that both the tender and the surface support team

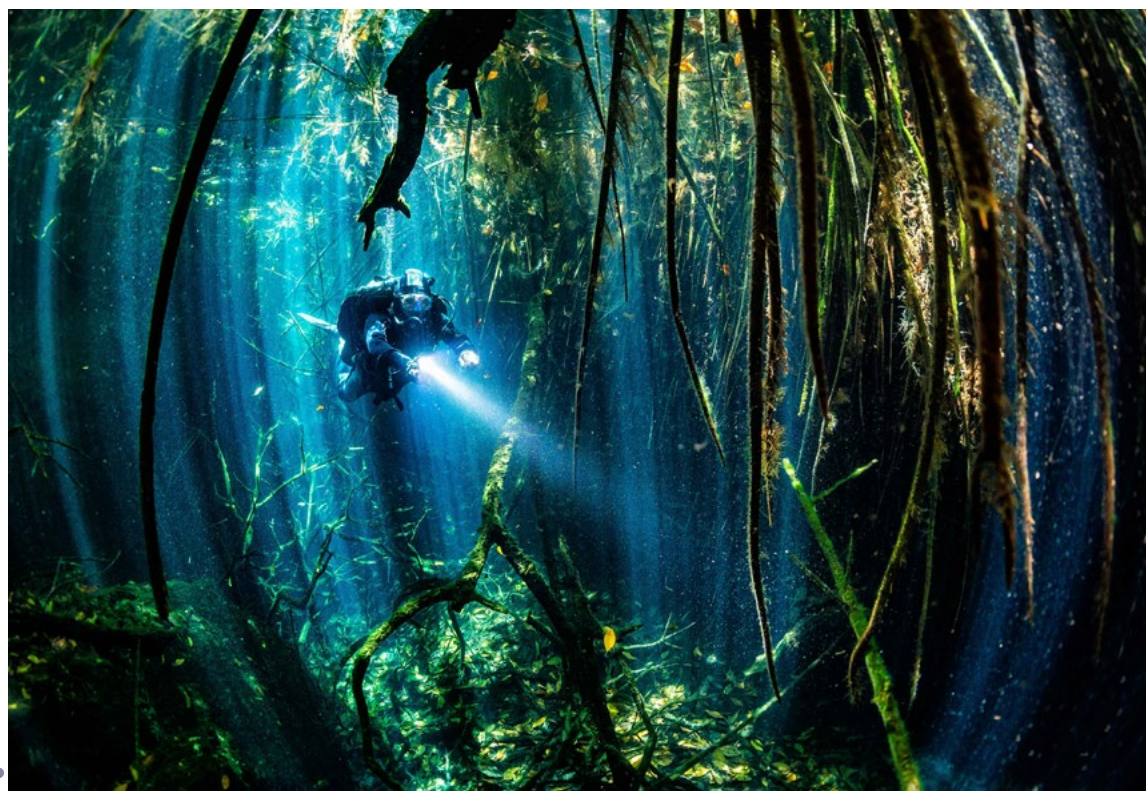
can monitor the injured diver, and to prevent against drowning, should the injured diver lose consciousness.

A gas manifold capable of switching from oxygen to air is typically used to allow the tender to continuously provide an appropriate gas to the injured diver, and to serve as a method to quickly transition the injured diver onto standard air in the event of oxygen toxicity. IWR can require prohibitively large quantities of oxygen and air, to supply both the injured party, and their attendants with breathing gas for the length of the process. It is important to continue breathing oxygen on the surface for several hours after completion of IWR.

## The risks

The process of IWR presents a number of concerns with the possibility of serious consequences for untrained or poorly prepared divers. Attempts at in-water recompression have resulted in fatalities in the past, and a careful risk versus reward analysis must be undertaken before considering IWR.

Divers will have oxygen toxicity, hypothermia, and dehydration to contend with when attempting IWR. Critical challenges can arise due to loss of consciousness in the injured diver, and an



unsuccessful attempt at IWR may leave the diver in worse shape than they had been before the procedure.

In addition to the difficulties that IWR presents with diver management and monitoring, some divers will have their condition degrade regardless of treatment, which could present additional complications in the water. Add to this the fact that the divers who need immediate treatment the most are often too ill to safely submerge, and it can be a daunting task to manage the risks of IWR.

Many cases of DCS will improve with just the administration of oxygen on the surface, which narrows the field of appropriate circumstances for recompression in the field considerably. Appropriate equipment and preparation may lessen some risks, but the most appropriate equipment for use in treating DCS in divers is a recompression chamber.

In-water recompression of any type is not currently recommended by DAN, and the medical and research communities are divided on the issue. Most diving

medicine experts recognize the value of IWR in very specific circumstances, but there are a wide array of concerns and caveats that must be discussed before approving an IWR protocol. IWR using standard air has been shown to have a high failure rate, and while recompression using oxygen instead of air has been used successfully in some applications, it presents an additional set of risks.

Divers considering the utility of in-water recompression for their own expeditions should carefully consider their own training and equipment capabilities, and perform an analysis of the possible risks and rewards of the procedure. In all but a very specific minority of cases, the risks of IWR make it difficult to consider. In addition, some researchers have found that many cases of DCS, and most mild cases of DCS, show improvement even with delay to treatment exceeding 24 hours, which may further negate a benefit of IWR for many potential practitioners. ■

For more information on safe diving practices, visit: [DAN.org](http://DAN.org).



# Maldives

*The Central Atolls*

Text and photos by Brandi Mueller







A pair of fire dartfish

A spectacular night dive saw massive nurse sharks hunting at Alimatha Pier of Vaavu Atoll (above); PREVIOUS PAGE: Manta at the manta cleaning station, Moofushi Beru

**I was not planning to go on the night dive. It was the first night of the trip and I was a little tired, I already had my camera batteries charging and was all settled in with a book for the night after a fabulous first day of diving with turtles, sharks and tons of fish. But Fernando, our dive guide, told me I had to go. Usually, when the dive guide says you have to go, you better go, so I put my camera back together and I was ready in record time.**

The dive site was Alimatha Pier at Vaavu Atoll. We did our giant strides into the black water and immediately we were greeted with a ripping current. They said to bring reef hooks if you had them, which I did not, so after getting to the bottom I found a rock to hold on to. Getting comfortable, I looked around. There were giant white shadows against the inky black water.

Moving my light around, I saw them—

massive nurse sharks. They were in front of me, behind me, and above me. Then a stingray glided over the sand like a magic carpet flying by, right next to me. Hunting trevallies were making use of our lights, whizzing by us and making that whooshing sound before devouring the fish our lights lit up for them. All the while the current was rushing by, making it hard to stay in one place.



Schooling bluestripe snapper (above); Hawksbill sea turtle (top right)



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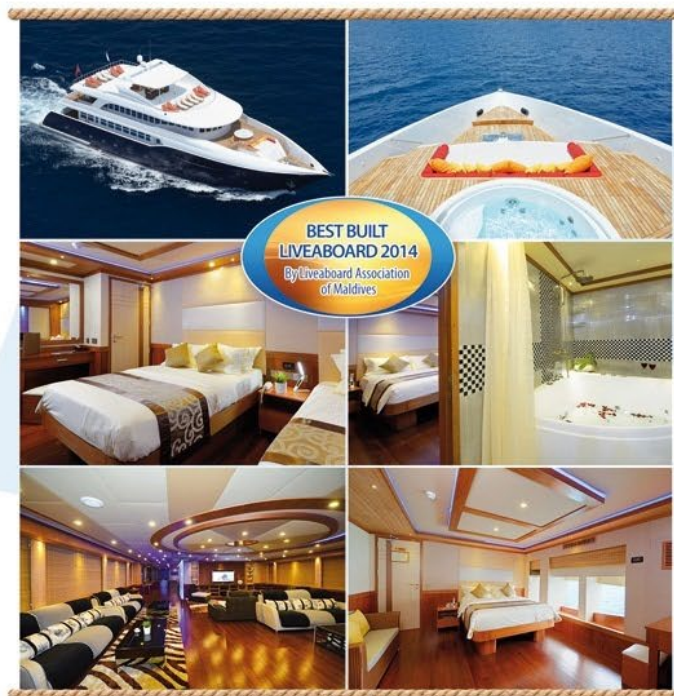


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## Maldives



Aerial view of the Maldives from the plane (above); Clown triggerfish (right)

The dive took place on a sloping bottom that went from about 10-15m (30-50ft) and then there was a steep drop-off. The drop-off was to my right, and at one point, I looked in that direction toward what would be open blue if it were not pitch black, and my lights just barely lit up the white bellies of more sharks than I could count. My entire view was a wallpaper of nurse sharks, ghostly white shark-shapes in the black. It did not even look real.

When our air was nearing empty, and we were forced to leave the sharks, and we came up from the dive cheering. Still high on adrenaline, we looked up at a million stars on the moonless night in the middle of the Indian Ocean and we waited for the dhoni, a traditional fishing boat re-purposed for diving, to come and pick us up to take us back to the *Blue Force One*, our home for the week. I was so glad I went on the night dive.

### The Maldives

Flying into the Maldives feels like you are flying over blue for ages. Endless sapphire stretches on and on. Around the time the pilot announced that landing was about to begin, specs of green ringed in white started showing up. Stretching 760km (472 miles) from north to south and 120km (75 miles) east to west, there are over 1,200 picture perfect islands in 26 atolls. It is hard to deny the romance of these tiny green specs of palm trees with sugary white sand beaches surrounding them, most of which are uninhabited. Not to mention the diving is said to be incredible.

A destination that has been on my bucket list for years, it is hard to not dream of visiting these far away islands in the Indian Ocean. I had a certain giddiness as the plane landed in Malé and stepping outside of the cold plane into the equatorial humidity, I knew my next week div-



ing in the Maldives was going to be fantastic.

Leaving the airport, I found some of the crew, and as we set off to the boat, I realized the airport had a pier. We did not even have to drive







Maldives

At 42m (138ft) by 12m (39ft), Maldives Blue Force's liveaboard, MV Leo (right) is the perfect place to spend a week. It has two hot tubs, three sun lounge areas, a spacious and comfortable salon, and large decorative passenger cabins; The hallway with blue mood-lighting led to most of the cabins (left); Hot tub on the bow (above); Lounge area and bar area (top right)

This award-winning boat has been voted one of the top liveaboards in the Maldives multiple times, and for good reason. It is 42m (138ft) by 12m (40ft) and has four levels. There are two jacuzzis, three areas for sunbathing including the entire top deck, as well as a beautiful salon with a large TV, comfy couches and plenty of space. One of the favorite

hangout places after the day of diving was complete was a lounge next to the upper deck bar, which had some tables and chairs and there was even a foosball table onboard (my favorite!) The rooms were amazing too. My bathroom was larger than most entire cabins on other liveaboards, and I was just in one of the normal rooms. The boat has a master suite, master cabin and a junior suite as well. My bathroom had a large shower, with optional rainshower head, plenty of room to move around and a large sink with drawers for storage. The rooms were also very spacious, the beds were comfortable, there was good air-conditioning, and each cabin had its own TV, although I never once turned mine on. Some of the suite cabins had full bathtubs, and three had their own in-room



jacuzzis and large sea view windows.

The boat can take 22 passengers and has a crew of around 16. Twenty-two sounds like a lot of people, but the large boat never felt crowded. In fact, I often found myself the only person on the sundeck or in the salon as there was plenty of room for us all to spread out and get a little bit of that feeling like we were on our own private yacht. The crew kept everything spotless and they were always there to help get dive gear ready



or pour a glass of wine. Three meals a day were served buffet style outside but protected from the sun or rain. The outdoor dining area was a lovely place to drink coffee in the morning and

anywhere to get on the boat. We simply crossed the street and got on the dhoni, which would take us to the liveaboard, our home for the next week.

**The liveaboard**

The Maldives is a pretty big bucket-list destination. If you are going to do it, you might as well do it in style, and the Maldives Blue Force One is definitely that. It is, by far, the most beautiful, spacious and comfortable liveaboard I have ever been on—a true luxury yacht made for scuba divers.



Beautiful salon area of the MV Leo liveaboard; Sundeck (right inset)







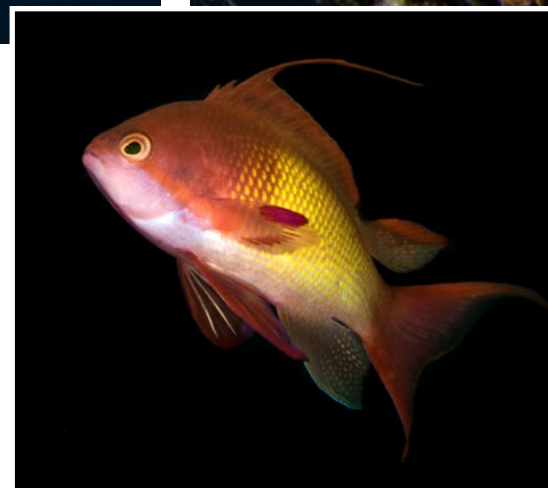
Sea turtle descends after taking a breath at the surface (above); Anthias with grouper resting on a small shipwreck off Kuda Giri Reef (top right); Anthia fish (right inset) can range from 4-12cm (1.5-5in)

watch the sun rise before our first dive or have that glass of wine and watch the sunset.

**Dhoni diving**

All diving took place off a dhoni, the local name for multi-purpose boats with motors or sails. Original dhonis resembled traditional Arab sailing vessels, and ours was designed perfectly for diving. The 18m (60ft) vessel would pull up along the main boat and we were able to easily board just by stepping across one boat to the other. All of our dive gear was left on the dhoni and tanks were filled there. When the boat was transiting to other areas, the dhoni drove behind us.

Diving from the dhoni made it easy to get to dive sites that might be too shallow for the main boat and most



of the diving was drift diving. So, the dhoni was perfect to drop us off at the dive site and then pick us up, wherever the current took us.

One delightful touch was that staff gave us clean dive towels to take on the dhoni every morning. Having separate towels for diving from those in your room is always a nice feature, as oftentimes, dive towels start to get a bit smelly and perpetually damp by the end of the week. Being able to grab a clean, fresh towel everyday was fantastic. It was one of the many

All diving takes place off the *dhoni* (right), not the main boat, making it easy to get to dive destinations. Gear is stored and tanks are refilled on the dhoni too.

small details that made diving with Blue Force such a fantastic time.

**Day 1**

On arrival day we spent our time getting settled on the boat and meeting our ship-mates. After a lovely dinner, most of us headed to bed early to recover from the jet lag of our long journeys. But we were up bright and early the next morning for our first day of diving.

**Kurumba.** Our first site was Kurumba, just a little way from Malé. This lovely dive site had a nice mini-wall covered in corals and fish including about a million anthias. We had two gray reef sharks swim by, a playful octopus and



even a turtle. Not bad for the first dive.

**Kuda Giri.** The boat then headed to South Malé Atoll to a dive site called Kuda Giri, a nice reef with a small wreck in the sand. There was quite a bit of current on the dive and the wreck almost seemed to be moving due to all the fish swimming above

Octopuses were spotted on almost every dive. This one emerged from its hole to put on a color-changing display.





Large aggregation of anthias on reef

and around the ship in the current. Lionfish were out hunting smaller glassfish. A gang of trevallies were trying their luck at getting dinner, and every time one of them would speed into the cloud of fish swimming around the wreck, the cloud would instantly condense and disappear for a second in an audible, "Whoosh," and a few seconds later the fish returned to their buzzing cloud about the ship.

**Miyaru Kanduu.** Continuing south we headed to Vaavu Atoll to a site called Miyaru Kanduu. The islands of the Maldives are all



Emperor angelfish (above)  
School of bluestripe snapper (right)

atolls, which are remnants of extinct volcanic islands. Once an island is formed and stops growing, the ocean goes to work eroding the island. In the end, all that is left is an island ring of former coral reef, with a lagoon of saltwater in the center. There are usually breaks in the circle island where channels have been created and allow ocean water to go in and out of the lagoon



during tidal changes. This is where the Maldives' adventure diving comes into play. At certain times, the influx of water in or out of the lagoon creates a ripping current.

Miyaru Kanduu is one of these adventure dives. The dhoni dropped us off on the ocean side of the island and the current carried us to the channel opening. At this opening, we used reef hooks (or held onto rocks) and we stayed for most of the dive in this opening, as the current ripped past us. Sharks and other pelagic animals love these areas where the strong currents are. Once we were hooked in, we just watched the show, with dozens of gray reef

sharks swimming by, huge dog-tooth tuna, tons of fish and even an eagle ray.

When it was time to head to the surface, we simply released the reef hooks and let the current take us through the channel to the inside of the lagoon where the dhoni picked us up.

**Alimathaa Pier.** Our night dive was the nurse shark night dive at Alimathaa Pier—most definitely a dive I will not ever forget. Still amped up after the shark night dive, I headed to sleep with dreams of sharks dancing in my head.



Close-up of schooling glassfish







Large lion's mane jellyfish, with tiny juvenile fish swimming among its tentacles for protection at Devana Kandu (above); Balled-up anemone with anemonefish at Dhigurah (right)



Threespot angelfish and anthias on reef

## Day 2

**Devana Kandu.** We started our day still at Vaavu Atoll and dived Devana Kandu—another dive with a lot of current—with the hopes of seeing sharks. Soon after getting in the water, we were drifting, and I saw a large shadow off in the distance.

Keeping my eyes on it, soon it came into focus and was a massive lion's mane jellyfish! I swam after it, and it seemed motionless, just drifting in the current, except for a thousand tiny juvenile fish swimming with it. They scattered about the jellyfish never holding still, while this large mass just lead them wherever the current took them. I could have

stayed with it the whole dive just observing the delicate relationship between the fish and the jellyfish as they drift in the current. The ocean is just amazing, but there were still sharks to see, and I had drifted a little bit away from the group, so I had to kick back into the current to get to where they were.

**Maamigili and Dhigurah.** Next it was off to South Ari Atoll in hopes of whale sharks. We tried to find them at two dive sites, Maamigili and Dhigurah, but no such luck. I have no doubt they were there, but the visibility was quite thick and green, and they were probably hiding in plain sight. Even without spotting the largest fish in the ocean, we still had



two fantastic dives.

At Dhigurah, towards the end of the dive, I swam a little shallower, to see what was happening at the top of the slop and came across a lovely balled-up anemone. It was pinkish purple, with two bright orange anemonefish swim-

ming about it. With the sun low in the sky, it was perfect for photography, and as I kept snapping shots, I saw my dive buddies swim further and further away. "But it's so pretty," I thought, "why are you guys not stopping and taking photos of this too?" with one more shot before





commands better this time, ignoring all the photogenic sharks, and went straight to the mantas on the second dive.

So far, we had three out of three dives with mantas—not bad for what our guides told us would be “Manta Day.” But we still had

a night dive, and for that we went to Emadi Maaga, also on North Ari Atoll, and using the dive boat’s powerful stern light to attract plankton, we had two mantas feeding behind the boat before we even jumped in the water.



THIS PAGE: Scenes of mantas at the manta cleaning station, Moofushi Beru; Whitetip shark on reef at Moofushi Beru (right)

swimming quickly after them. As I was swimming to catch up, I saw they were everywhere. Over a dozen identical balled up anemones. Maybe that is why my buddies were not so concerned.

Dinner was quite a surprise, as the crew of the *Blue Force One* set up a candlelight dinner for us on an uninhabited beach. We arrived by skiff and were served an amazing meal under the stars, with the beautiful *Blue Force One* lit up on the water. It was a fantastic way to end the day.

### Day 3 – Manta Day

**Rangali Madivaru.** Still at South Ari Atoll, we started off the morning at Rangali Madivaru, with hopes of seeing mantas. A lovely, relaxing dive without a lot of current, we saw a few sharks, two turtles—and at the very end, one manta swam by.

**Moofushi Beru.** Heading to North Ari Atoll our next dive was at a manta cleaning station called Moofushi Beru. My dive guide told me not to get distracted with

the sharks because this dive was all about mantas (it was as if he had already figured me out). I could not help it though—after descending to about 25m (82ft), there were whitetip sharks just sitting in the sand all over the place! So I spent some time chasing them around trying to get photos until the first manta swam by. Then I remembered to focus on the mantas and followed the group to the cleaning station.

The cleaning station looked like a large round table of coral, with two mantas hovering just above it and tiny wrasse coming out of the coral to clean them. We stayed low on the outside and watched as the mantas slowly seemed to fly in for their cleaning and slowly fly out, making a large circle and coming back again. The dive was so good, I was really happy when they told us we would be doing it again on the next dive. I followed





Maldives



View from the liveaboard of mantas feeding at night at Emadi Maaga (above); Mating octopuses at Fish Head (top right and right)

**Emadi Maaga.** The dive took place right under our boat, and as we knelt in the sand, I noticed it was a very fine silt that quickly got stirred up and reduced visibility. We sat in a semi-circle under the boat light and waited. After a few minutes, I had sort of given up on seeing mantas (they might have been there, but the visibility was so bad, they would have to, literally, be next to us for us to see them). But then, like a lightning bolt, a manta sailed by, just above my head. It actually scared the bejesus out of me!

Manta day was quite a success. After dinner, several of us got a glass of wine and sat on the back of the boat to watch the two mantas do their ballet

dance of feeding, late into the night.

**Day 4**

**Fish Head.** The diving had been great so far, and we kept joking about how the crew could possibly make it any better. Our morning dive was at a site called Fish Head (it also has a very long Maldivian name, but this is a lot easier to spell and pronounce). The highlight of this dive for me was a pair of mating octopus, which I stayed with for most of the dive. The male would slowly extend his hectocotylus (the male's specialized arm that can transfer sperm to the female) and he almost seemed to hold it in front of her face for a while before he would

wrap his arm around her in an attempt to mate.

**Bathalaa Maagaa Thila.** Next, it was more shark action at Bathalaa Maagaa Thila on North Ari Atoll. A fairly swift current took us over the reef, and whenever we looked out into the blue, there were numerous sharks off in the distance. We also saw an absolutely massive Napoleon wrasse and a few more octopuses.

**Madivaru Beru.** Our last dive of the day was at Madivaru Beru on Rasdhoo Atoll, and as the boat moved to the site, a few lucky passengers got a glimpse of a whale shark. We had an easy drift dive

over some of the best coral we had seen all week. We saw several sharks, a turtle and large schools of blue-stripe snapper and jacks.

**Rasdhoo.** We finished the day by taking a short walk around Rasdhoo, a local inhabited island. It was really neat to see how the people of the Maldives lived





Huge Napoleon wrasse at Madivaru Beru (left); Moray eel being cleaned by bluestreak cleaner wrasse (lower left); Lionfish on small wreck at Kuda Giri Reef (right)

and she put on her homemade tail and swam around a bit to show us what it is like being a mermaid.

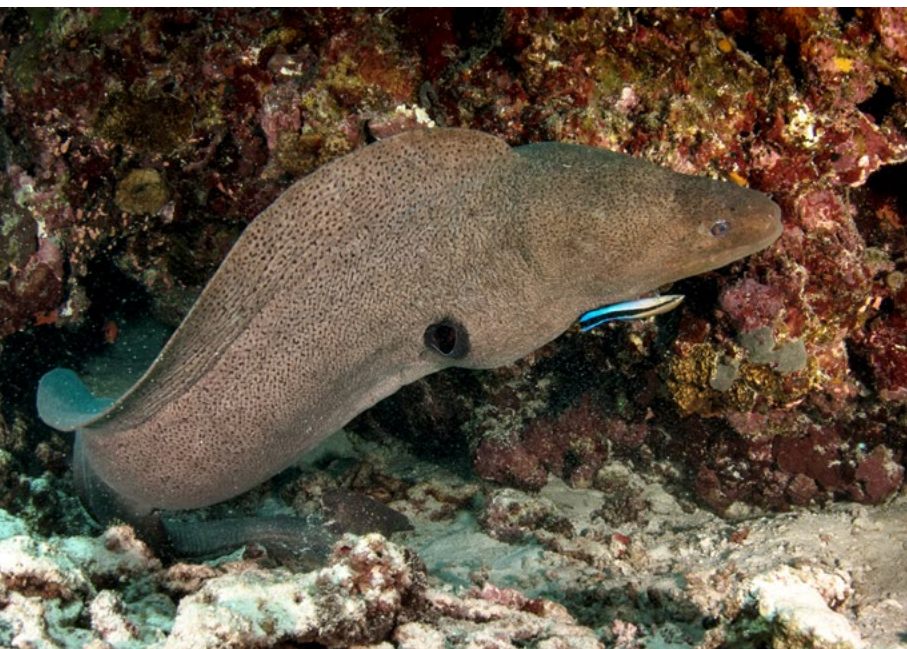
### Diving tips

Diving in the Maldives is not for the faint of heart. Many of the dives have very strong currents, which may change throughout the dive. Most of the dives are drift dives, for which the dhoni drops divers in the water at one place and then picks them up wherever the current takes them. Because of the strong current, a safety sausage (and the ability to use them) is required in case of

separation from the group. Blue Force does not require advanced certification for this trip, but many other companies doing similar itineraries do, and advanced certification and experience is highly recommended for most Maldives diving.

Reef hooks are also a good piece of gear to have. They can be used in the strong current to “hook in” to a rocky area and hold you in one place, without having to use a

One of the liveaboard guests was Mermaid Melanie (below), a dive instructor and a professional mermaid. She posed for a few underwater shots in her handmade tail.



to see through. After a few minutes of searching, we headed back to the reef (I have no doubt the hammerheads were there, we just could not see them).

Back on the reef, we spent our last dive among the coral gardens, with a few whitetip reef sharks and a huge Napoleon wrasse swimming by. At the end, we were doing our safety stops and several zebra unicornfish came and swam directly on top of our heads

and being able to see the Maldives from land instead of water.

### Day 5

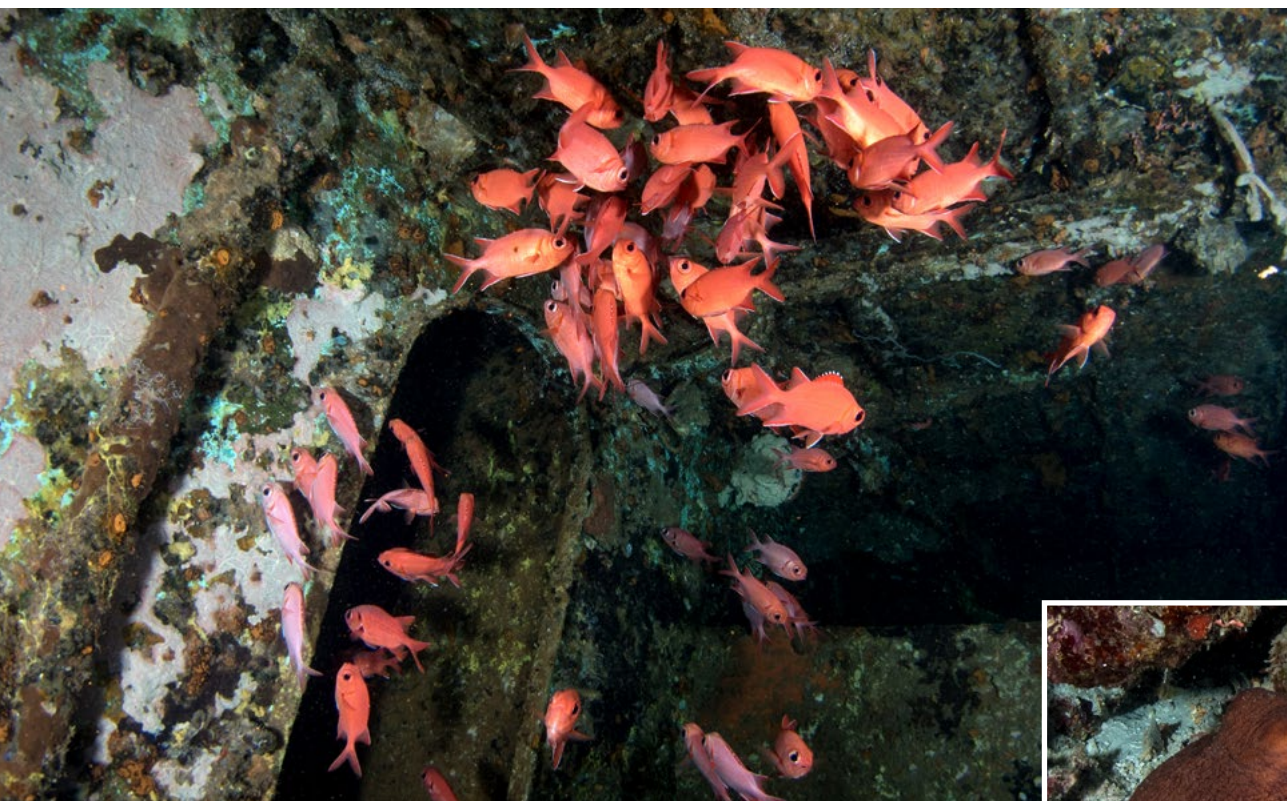
**Madivaru Beru.** On our last day, we got up extra early in hopes of getting a glimpse of a hammerhead shark at the dive site Madivaru Beru. We dropped in and headed out into the blue at about 30m (100ft). Unfortunately, there was a thermocline at about 20m (60ft), and the cooler water was quite green and hard

like they were playing in our bubbles.

We emerged to the surface, surrounded by turquoise blue water and a dot of green off in the distance, where the dhoni picked us up one last time. The rest of the day was spent relaxing on the picture-perfect MV *Leo*. I also had the fantastic opportunity to snap a few photos of a much sought-after marine creature—the elusive mermaid. We happened to have a professional mermaid (and scuba diver) onboard with us,







Night dive at Alimatha Pier of Vaavu Atoll found massive nurse sharks patrolling the reef (above); Common octopus (below); Squirrelfish inside a small wreck off Kuda Giri Reef (left); Sweetlips, grouper and parrotfish on reef (top left)

lot of energy to kick into the current or damaging the reef.

The boat separated us into groups of five or six, depending on skill level, and I was really impressed with how they did this. As a scuba instructor and single diver on a liveaboard, it is usually quite hard to get paired up with another advanced single diver,

which is just the chance you take when going on a trip without your dive buddy. But I really felt Blue Force went above and beyond to make the diving the best possible for every diver, no matter what their skill level, including advanced divers.

I got incredibly lucky in

that there were two other instructors, who were liveaboard guests,

and I really appreciated that they put us all together, with two other advanced divers, and they allowed us to dive at our skill level. Dives had a time limit of 60 minutes, but our guide let us dive right up until 60 minutes (and sometimes a little longer) on every dive. With the separate groups, we were able to dive at our skill level—while diving in our limits, of course.

The Maldives is an amazing place for big animal sightings, which photographers will love. However, the big animals show up

because there is plenty of food in the water, such as plankton and algae, which can make for limited visibility. This can cause sub-optimal shooting conditions, especially when trying to avoid backscatter. I recommend having long arms on your strobes so you can move them far away from the camera, and angle them slightly, to avoid front-lighting particles. Also you can try using diffusers on your strobes, turning the power down, or if nothing else, turn the strobes off.

### Staying connected

On a side note, I was completely amazed by the potential of staying “connected” while on the boat moving throughout the

islands, seemingly in the middle of the Indian Ocean. At the airport, it is very inexpensive to purchase a “tourist” package for data and cellular plans. Throughout the trip I had 3G and 4G internet, and the boat offered free Wi-Fi too.

I am not sure if it is a good thing or not, as sometimes disconnecting can be beneficial. But for someone who needs to check in, even on vacation, it was easy to do so (and also easy to share those epic manta photos via Facebook, immediately). As we watched the mantas do back rolls behind the boat one night, one passenger was face-timing with his son, showing him the action in real time, by transmitted from a small cell phone—a pretty





THIS PAGE: The Maldives' capital city of Malé is a vibrant, bustling center full of markets, fishing boats and motorcycles; I was told that after you choose your fish to purchase, these people (lower left) will fillet them for you in minutes. Aerial view of Gulhi (right)



experience, firsthand, what it is like to speed along the skinny streets of Malé, packed with other bikes, people and cars. Seeing Malé was definitely worth skipping my afternoon nap, if

could easily come back to the area again, as well.

*Maldives Blue Force* has several special weeks each year when professional photographers, videographers and researchers, such as those with Manta Trust, come onboard to educate and dive with passengers. During my trip, we were lucky enough to have a professional videographer, Rafa Herrero, onboard. He shared some of his amazing work, dived with us, and answered questions throughout the week. *Blue Force* also does family weeks and free diving clinics, so there are plenty of different itin-

eraries to check out on this one, beautiful boat.

With so many islands, one could easily come back to the Maldives over and over again, before even scratching the surface of the many amazing dive sites. Diving with *Blue Force One* is definitely the best way to do it. Sign me up please! ■

capital of the Maldives and one of the most densely populated places on Earth, with over 133,000 people living on this tiny 5.8 square kilometer (2.2 sq mile) island. Skyscrapers cover the small land mass from end to end, and as soon as you set foot on the island, you are aware of the thou-

sands of motorbikes whizzing through the streets.

**More to explore**

My trip included the Central Atoll Itinerary, which went around North and South Malé Atolls, Felidhoo, Ari Atoll and Rasdhoo Island. After talking with the dive guides, it sounded like visiting the Southern Atolls was worth a trip back. Accessible only a few months of the year, they told us there was even healthier corals, more big animals, more fish and more remote islands in the area. I felt like we only got a small glimpse of the Central Atolls and



cool experience to be able to share in real time.

**Visiting Malé**

On the last day of the trip, after the diving was finished, there was an option to ride with the crew on the dhoni to Malé and take a look around the city while they re-provisioned. It was a tough decision to choose between that or napping on the sun deck, but at the last minute, I decided to check out Malé.

Malé is an interesting place. It is the

sands of motorbikes whizzing through the streets.

A local guide gave me a walking tour, showing me where the president resides, several mosques, the local market and the fish market. Outside the fish market were rows of boats, just back from their day out fishing. Friends of my guide let me go on one of their fishing boats and showed me their catch. Then, since it was just me on the tour, he decided to bring me back to the dhoni on the back of his motorbike, where I got to

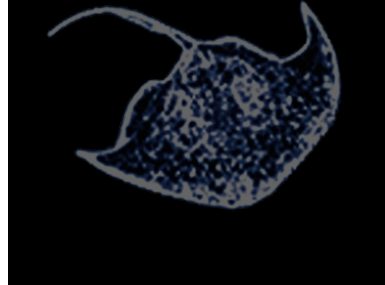
Special thanks to Maldives Blue Force ([Maldivesblueforce.com](http://Maldivesblueforce.com)).

Brandi Mueller is a PADI IDC Staff Instructor and boat captain living in the Marshall Islands. When she's not teaching scuba or driving boats, she's most happy traveling and being underwater with a camera. For more information, visit: [Brandiunderwater.com](http://Brandiunderwater.com).

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# fact file



## The Maldives



SOURCES: US CIA.GOV, XE.COM, LONELY PLANET, MALDIVESBLUEFORCE.COM, VISITMALDIVES.COM

**History** The Maldives are believed to have been first inhabited over 2,500 years ago by settlers from India and Sri Lanka, though the ancient recorded history is incomplete and little archaeological evidence remains. The country is located along the main maritime trade routes and the strategic positioning is believed to have played a role in early colonization. For most of its history, the Maldives existed as an independent entity. There were brief periods of foreign control by the Dutch and the Portuguese, and in 1887, the Maldives became a British Protectorate. It remained under British control until it gained its independence in 1965. The first resort was opened in 1972, and today, the tourism industry is considered one of the best in the world. The Maldives is also a world leader in promoting the protection of

small countries and conserving the environment. Government: republic. Capital: Malé.

**Geography** The smallest of the Asian countries, the Maldives is located in the Indian Ocean south-southwest of Sri Lanka and India. The country consists of an archipelago of 1,190 coral islands clustered into 26 atolls, which are spread out over 90,000 sq km. Roughly 200 of islands are inhabited, with nearly 100 of them hosting tourist resorts. The highest point on the islands is only 2.4m and thus the country is at risk of being swallowed up by rising sea levels due to global warming. Coastline: 644km.

**Climate** The climate in the Maldives is tropical and is greatly influenced by the Iruvai ("dry" northeast monsoon that typically blows mid-November to April) and the hulhangu ("wet" southwest monsoon in May to October). Air temperatures are fairly constant between 29-32°C (84-90°F) year-round and water temperatures fluctuate between 27-29°C (80-84°F). Steady sea breezes help offset the high humidity levels.

**Economy** Tourism

accounts for nearly 30% of the Maldives GNP and is the largest economic sector. Fishing, which used to lead their economy, now comes in a distant second. Agriculture and Industry play a minor role but are limited by the lack of cultivable land and a shortage of local labor.

**Environment** Challenges include sea level rise due to global warming; depletion of freshwater aquifers, which is threatening water supplies; and bleaching of coral reef.

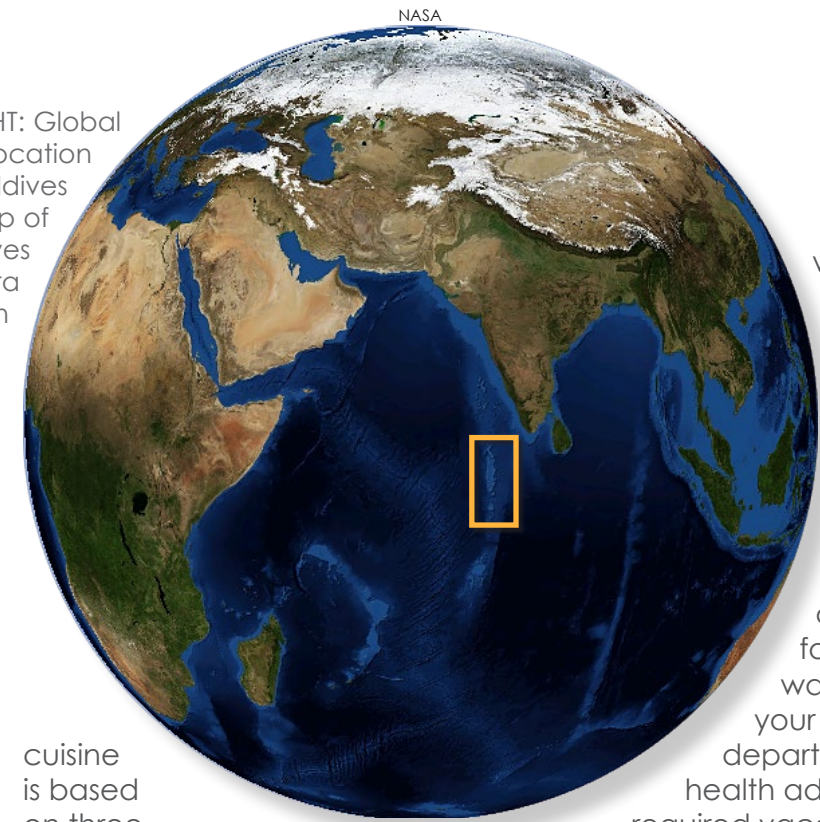
**Population** 393,595 (July 2014 est.) Primarily comprised of South Indians, Sinhalese and Arabs. The official religion is Sunni Muslim.

**Language** Dhivehi is the official language in the Maldives. It is a dialect of Sinhala and the script is derived from Arabic. At resorts, English is widely spoken as well as Spanish and German.

**Currency** Maldivian Rufiyaa (MVR). Credit cards are widely accepted at tourist destinations. Exchange rates: 1USD=15.21MVR; 1EUR=16.25MVR; 1GBP=19.14MVR; 1AUD=11.52MVR; 1SGD=10.73MVR



RIGHT: Global map with location of the Maldives  
BELOW: Map of the Maldives  
LOWER LEFT: Zebra unicornfish



with yellow fever, you must show proof of yellow fever vaccination before admittance. Please check with your state department for any travel warnings and your health department for any health advisories or required vaccinations.

cuisine is based on three main ingredients; fish, coconut and starches. Fish is found at nearly every meal in one form or another and is even used as a topping for pizza. Starches are comprised of rice, potatoes, taro, cassava and breadfruit. Coconut is eaten fresh or as coconut milk or oil in various dishes.

**Tipping** A service charge is added to most everything in the Maldives, so tipping is not required. However, tipping is expected on liveaboard dive boats and at most tourist resorts. Each establishment will have their own guidelines and recommendations.

**Driving** The islands only have 88 km of total roadways, most of which reside in the capital of Malé. Boats and small planes are the only way to get around the islands and atolls of the Maldives.

**Health & Safety** Currently, there is risk of Zika virus in the Maldives. Avoid mosquito bites. There is no risk of yellow fever, but if you are arriving from countries

### Decompression Chambers

Bandos Island Resort, Bandos Medical clinic and hyperbaric center, tel: + 960 440 088

Kandoludhoo Island Resort, Kandoludhoo Divers Rescue tel: + 960 773 485

Kuramathi Resort, Kuramathi Medical center hotline: +960 777 3485

**Travel/Visa** The Ibrahim Nasir International Airport is located adjacent to the capital of Malé and is the only International airport in the Maldives. Flights from a variety of airlines connect directly to Malé via Singapore, Bangkok, Dubai, Kuala Lumpur, among others. A passport is required for entry and a free 30-day visa is granted on arrival. Customs checks are extremely strict and the import of alcohol, meat and pork products, drugs, pornographic material and underwater fishing spear guns is prohibited.

### Websites

Maldives Tourism  
**Visitmaldives.com** ■







# Austrian Lakes

Text and photos by Marco Daturi

— *Grübl See & Grüner See*





Controlled feeding of fish such as trout and char (left) is a fun activity that is allowed; In in Gröbl See; In between dives, one can enjoy the magnificent scenery around the lake (above)

ing for food that is normally found along the shore. There is a ban on fishing but controlled feeding is allowed.

On the seabed of Gröbl See, there were a number of statues put in place, but they were of no interest to us, as we focused on enjoying the frenzy of fish,

which was a bit unusual. There was movement everywhere. Trout and char darted in and out, and just as quickly, disappeared into the green of the lake—the typical shade of cold mountain waters.

The diving was fun, but the surface was also a pleasure. Air temperatures topside around Gröbl See, at 1,160m in the mountains, are nice and crisp. Here, one can enjoy

total relaxation, thanks to a comfortable dive center, Gröblsee Alpenaquarium—the highest in Europe. The owners, Sabine Hausner and Robert Marschnig, are fantastic, friendly

**Austria offers divine diving at high altitudes in freshwater lakes. Marco Daturi takes us to two beautiful lakes found in the mountains of Styria—one that continues to enthrall and one which has recently been closed for conservation and protection.**

**Gröbl See** At a depth of 9m, the water is clear and remains so, as divers gently descend. Even from the surface, you can see many curious fish, which show up as soon as you begin your dive. They approach fearlessly and swim among your bubbles, while search-



Gröblsee Alpenaquarium is the highest dive center in Europe







A frenzy of fearless friendly fish greet divers in Gröbl See

and welcoming, ready to receive dozens of guests for summer weekends. In addition to scuba diving, one can definitely appreciate the magnificent scenery, relaxed atmosphere and delicious Austrian dishes cooked by Sabine and accompanied by excellent Austrian beer.

There is always more to learn and surprises in store for the curious at Gröbl See. This artificial lake, in itself, may not have much interest, but you take home an unusual experience—and certainly an experience that will remain in one's memories rather than just in one's logbook.

A top destination for all diving and mountain lovers, a trip to Gröbl See was something that would have been combined with a trip to Grüner See, the "famous" green lake about an hour away. But diving Grüner See has recently been banned by

local tourism authorities, in order to conserve its clarity and natural green state. We were lucky to be some of the last few who dived this now protected lake.

### Grüner See — the green lake

For a short dive trip that was a little "different," we planned something unusual, far away from mass tourism. We were in the mountains of Styria, Austria, at the foot of the Hochschwab—the highest mountain range in the area, rising to 2,278m above sea level. A picturesque landscape here hides a very particular natural phenomenon that makes the Grüner See a very interesting location, not only for divers.

During the first warm days of spring, ice and snow of the surrounding snow-capped mountains begin to melt. The thaw sends icy waters racing down



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W4 is the latest back-zip wetsuit from Waterproof. After nearly 30 years of experience of making wetsuits we have put all our knowledge into this high-quality suit with an eye-catching retro-futuristic design.

The 3D anatomical design, with pre-bent arms and legs with stretch panels and gender specific construction ensures a comfortable fit and a relaxing body position in the water. 3D-moulded real rubber kneepads are perfect for the diving instructor who spends a lot of time on his/her knees in the water while teaching.

Double smooth-skin seals at arms and legs, adjustable neck and a 10mm spinepad, with an extra seal at the backzipper work together to keep the cold water out. Seals are designed to fit WP boots and gloves.

All zippers in top class Vislon from YKK. The Bronze slider in the back zipper ensures trouble-free function for many years. ToughTex panels at elbows and knees, Bonded HiQ Nylon Thread and 100% CR Neoprene in all panels - quality in every detail.

The W4 also features double computer strap anchors with anti slip, comfort front neck zipper, inner plush lining, seat and shoulder antislip reinforcement.



The WPAD™, or the Waterproof Personal Accessory Dock, is a soft artfully constructed docking station located on the right thigh used for attaching our expandable pocket.







into the valley where the water level of the lake rises several meters, submerging everything: lawns, paths, trees, dens, roads, flowers, bushes, bridges and benches. In just a few days, everything is immersed in crystal clear water.

This temporary lake, the Grüner See, is named after the color that comes from the submerged vegetation and green lawns. It is a time-limited phenomenon, which lasts just a few weeks. By the summer, the water evaporates, and the lake's water levels fall, dropping steadily until they return to winter levels. This cycle is repeated every year, which in the past before the dive ban, allowed a few weeks of interesting diving, with the best time limited, in fact, to May through June.

The water of Grüner See was incredibly crystal clear, with underwater visibility of over 50m, at least where there



were not hundreds of people underwater, which unfortunately happened almost every weekend in previous

years. The lake was, in fact, targeted by fans from all over Europe and, when the concentration of tourists was



THIS PAGE: We were lucky to be some of the last few divers to enjoy the crystal clear waters of Grüner See before diving was banned in 2017







© J. Haschek

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Divers enjoy refreshing meltwater in Grüner See, which could only be dived May through June

too high, you ended up losing the purity that characterizes it in the first place.

**Diving.** Once underwater, the first impression was that it was very refreshing, with the water temperatures around 6°C. The green water was continuous and faded into blue in some areas of the lake where large formations of chalky rock on the seabed affected different shades.

The underwater scenery was definitely out of the norm, with daisies and other flowers swaying on the seabed and fish swimming along paths, which would normally be used

by land animals for passage. Holes and crevices were completely flooded.

The lake was about 200m long, and one dive was not enough to explore it all. It was much better to avoid getting unnecessarily tired by dividing the exploration of the lake into stages.

Diving the lake was rejuvenating, and I imagine it would appeal to experienced divers looking for diversity, or underwater photographers, but also divers who wanted to escape and relax in a very picturesque setting. There was something for everyone, as long as one was appropriately equipped







Marco Daturi, who emerged from the warm waters of a nursery in 1972—a restriction prescribed by an inclement, authoritarian doctor—was always very close to the sea and the underwater world, which he continues to explore with a passion whenever he can. Having survived the attack of a Ligurian porter crab, the false attentions of Indonesian nudibranchs, an underwater wedding, and insistent invitations to get into technical diving, Daturi continues to enjoy the passion that is diving, which culminated in 2003 with the creation of [ScubaPortal.it](http://ScubaPortal.it). A certified divemaster, Daturi also holds a doctorate in economics, and two masters in marketing and sports management. For more information, visit: [ScubaPortal.it](http://ScubaPortal.it) or email: [info@scubaportal.it](mailto:info@scubaportal.it).



Grüner See is certainly a rare sight and diving in the lake itself was a unique experience that would leave one completely satisfied if done in the right way, at the right time, and possibly during the week when there are fewer people visiting. On weekends, more and more people came to dive the Grüner See, so it was inevitable that visibility would worsen during these busy times.

Since the lake is not, however, around the corner for Italians like me, and we have 7,500km of sea coasts to explore in our own backyard, we would probably think of a trip to the Grüner See as an option only after having accumulated

and clad, because the cold was still a factor to take into serious consideration.

During the dive, we had to be extra careful with buoyancy and finning technique. The seabed was indeed delicate and one wrong kick would send up silt that ruined the otherwise clear visibility of the lake.

**Topside.** Above the water, it is a fairy-tale landscape to which no one can remain indifferent. Especially on sunny days, the incredible colors of the water are beautiful and its crystalline transparency allows you to see the seabed.

many other experiences. It would then be a treat to add the Grüner See experience to a store of good memories collected over a lifetime of diving. Alas, diving in the lake is now prohibited. So let's not limit our discussion to the underwater realm, as one could think of a trip to Grüner See as an opportunity for a nice family vacation, which includes some diving in other lakes nearby. ■

*Please note that swimming and diving in Grüner See has recently been banned by local tourism authorities in a bid to conserve and protect the lake.*



Picturesque view of Grüner See (above); Author with wife and son (left)—the lakes make a nice family getaway



An underwater photograph featuring a seahorse as the central subject. The seahorse is positioned in the lower-left quadrant, facing right. It has a long, thin snout with small white spots, a brown and white striped body, and a long, thin tail. The background is filled with dense, green and yellowish-brown seaweed and kelp, creating a textured and vibrant environment. The lighting is soft, highlighting the intricate details of the seahorse and the surrounding marine life.

# Treasures of Tasmania

— *Adventure at the End of the World*

Text and photos by Brandi Mueller





**There is an island at the bottom of the Earth playfully referred to as the end of the world, or the edge of the world, and if I did not know better, I could picture this to be true. Standing at the edge of some of the steepest cliffs in Australia on the Tasman Peninsula of southeastern Tasmania, I looked out over the steep, jagged coastline and the steel blue Southern Ocean. Although I knew the next bit of land south would be Antarctica, if the world were flat, I could easily imagine this to be the edge, where sailors would fall off a huge waterfall into a pit of dragons or something. But wait. There really were dragons—right below me.**

The previous day, I was at the other end of these cliffs and 10m underwater, getting my first glimpse of weedy sea dragons, a unique and strangely beautiful marine organism endemic to southern Australia. Although not fire-breathing, these fantastic creatures are related to the seahorse family and have evolved to look just like the kelp near which they live, with leaf-like extensions along their body. Tasmania—and Australia, as a whole—are known for amazing, if not slightly strange, wildlife both above and below the surface of the sea. I was lucky enough to spend two weeks exploring the oft-bypassed island of Tasmania.

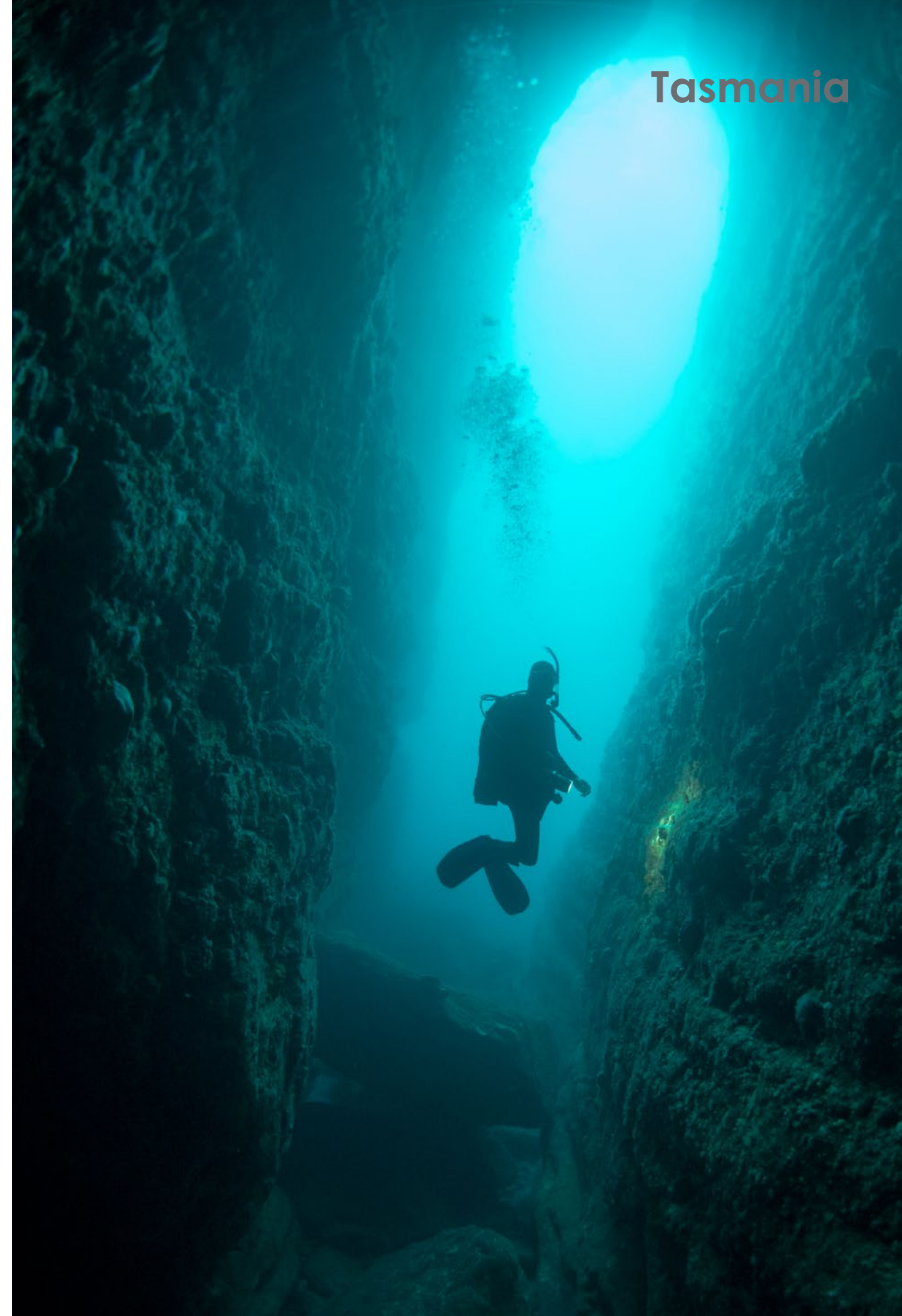
**Tasmania**

Not too long ago, if you told anyone you were going to Tasmania, they would give you a funny look and ask, “Africa?” “Is that a country?” or “Where?” Even mainland Australians would laugh and ask why you were going there, as it was the land of people with two heads and there was “nothing to do there.” But lately,



Tasmania has come into its own and become an eccentric mix of art, food and adventure—all wrapped around a pro-environment concept while being set amongst a backdrop of fantastic natural beauty.

With a population of just over half a million, the 68,401km sq (26,410 sq mi) island is about the same size as Sri Lanka, or a little smaller than Ireland, and it is



Diver in Cathedral Cave (above); Cliff views on hiking trail along Tasman Arch overlooking dive sites (top left); Biscuit seastar (left). PREVIOUS PAGE: Endemic to Australia, a weedy seadragon in kelp



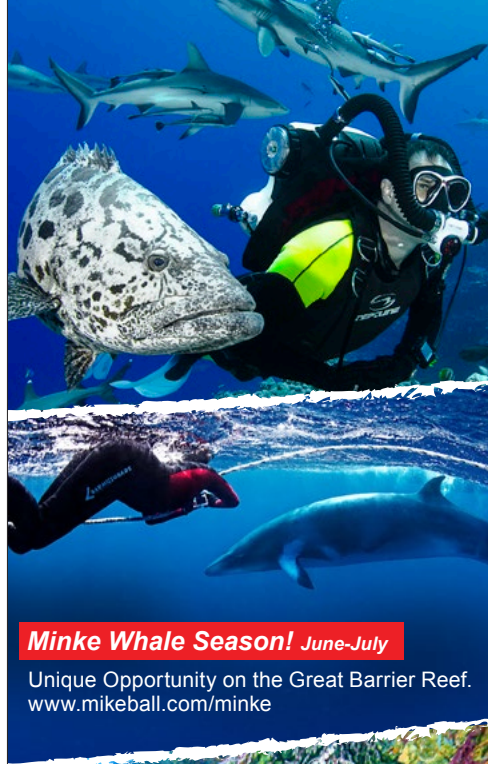


Tasmania

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CLOCKWISE FROM TOP LEFT: Organic apples at Our Mate's Farm are made into cider; Outdoor jazz concert at MONA; Wine tasting at Bruny Island Premium Wines; Selection of wines and plate of oysters served at Bangor Wine and Oyster Shed; Coffee served at a café named Atlas.



weather-resistant beanbag chairs (as well as more local wine and beer) and listened to the music in the sunshine under a perfect blue sky. There are also several superb

ries being sold by hobby farmers on the side of the road. Wineries, whiskey distilleries and cideries are around every corner. I visited cheese factories, chocolate factories and even a fancy espresso bar run out of a van parked on a cliff with a gorgeous ocean view—all of this while driving along narrow, twisting and turning coastal and forest roads, up and down mountains with spectacular views at every turn.

The turning point when Tasmania started to become a tourist destination was likely the opening of MONA, the Museum of Old and New Art, near the capital city of Hobart in 2011. I spent a day walking through this art museum, which places "old art" like Egyptian mummy tombs next to "new

art" such as modern abstract sculptures and paintings. Embracing technology, the museum has no information signs on the artwork, but you can use an iPod-like device with headphones to get all the information you need and then some. It has an internal positioning signal that shows what art work is currently in your vicinity, so you can read about each piece and there are sometimes additional options offered, like hearing the artist or the museum curators talk about the piece or even hearing music that might go well with the

work you are viewing. You can even click "love or hate" for each piece of artwork.

The museum itself is built into a cliff with a staircase transporting you to different levels. On the bottom floor is a barso where you can indulge in local wine or spirits while reflecting on the art, and outside, there is a grassy area and a stage, which often has concerts. My afternoon there had a jazz band playing, and everyone grabbed





CLOCKWISE FROM TOP LEFT: Hiking trail around Tasman Arch; View overlooking Pirate's Bay on the Tasman Peninsula where most of my dives took place; Pastries at The Old Bank of Geeveston; Coffee at the Cubed Espresso stand overlooking Pirate's Bay; Selfie inside MONA "On the Origin of Art" exhibition.

dining facilities and there is a winery and brewery at MONA.

"It doesn't get any better than this," kept popping into my head as I headed southeast to visit some diver friends, whom I met on a liveaboard several years ago. They have since decided to "live the good life" and moved to Tasmania to run their own organic farm. Walk-

ing around their organic apple orchard (and sipping some of the organic cider made from those apples) made me a little jealous. My mind started to wander... Maybe I also needed a little of this "good life living" and could I possibly also migrate to this fascinating island?

But my main purpose for visit-

ing Tasmania was not to indulge in food, drink and friends (even though I did plenty of that) but to dive below the adventurous cliffs of the Tasman Peninsula in the southeast corner of the island. I stole my friend's husband for a few days of diving (this time she had parenting duties,

but next time I would steal her instead!) and we headed to Eaglehawk Neck.

### Fur seals

I had read that there were New Zealand and Australian fur seal colonies around the Tasman Peninsula. So, while we drove to

## Tasmania



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THIS PAGE: New Zealand fur seals on the Tasman Peninsula

Gowlett-Holmes and Mick Baron, owners of Eaglehawk Dive Centre, Captain Mick said he was hoping to take us to a New Zealand fur seal colony the next day, if we were interested. We were.

Tasmania sits between the southern latitudes of 41-43 degrees, which is more southern than South Africa, and the northern hemisphere equivalent is about Chicago or France. Cold winds

of 15°C (58°F) made me a little nervous, as I piled on my 7mm farmer john rental wetsuit, boots, gloves and hood. The air temperature was not much warmer, and although the wind was calmer than the previous day, it was still making itself known.

But there was no changing my mind as the boat departed. Wind in my face, sea spray in my hair (actually I was wearing a wool beanie and already cold even though I was dry), we cruised the Pirate's Bay coastline below sheer dolerite cliffs, in which years of wave action have carved arches and underwater caverns and passageways. About 20 minutes later (looking up in awe at the cliffs the whole time), I spotted adorably cute fur seals sunbathing on the rocks. Several seals jumped into the water as the boat got closer

Eaglehawk Neck, I was musing in the car about how cool it would be to dive with some playful seals. Upon arriving and meeting Karen

blow from the south, and even in the summer, the temperatures are mild. Being a mostly sissy-warm-water diver, the water tempera-







THIS PAGE: Diving with New Zealand fur seals on the Tasman Peninsula; Several bluethroat wrasse in kelp (lower right)

neoprene turns one into a slow-moving marshmallow-person, but gear on and ready, I took my giant stride into the Southern Ocean, and oh-my-goodness, the icy chill took my breath away. Bobbing for a few seconds at the surface, getting comfortable with all the gear, a fur seal flew past me in a rush of bubbles and speed. My dive buddy and I gave the okay to descend, following the seal.

Captain Mick told us the seals would interact with us more if we were silly, so we took

to investigate. They mimicked our spinning and blew bubbles in our faces as they made high speed passes in front and behind us.

Taking a moment to absorb the rest of the underwater scenery, I noticed a small school of bluethroat wrasse pass over the thick green kelp, which was swaying back and forth with the swell. Staring at the kelp moving back and forth was almost hypnotic—was I moving or was it moving? And then my concentration was broken with the fly-by of an adorable fur seal.

### Waterfall Bay and Cathedral Caverns

We headed out for a second day of diving in perfect conditions. There was almost no wind, just sunshine and blue skies, which gave us conditions that would allow us to dive Cathedral Caverns. Water has etched the coastline for hundreds of years, and over time, has made caverns, caves and indentations in the cliff wall below the surface.

The boat moved right up to the rock and we jumped in the water, swimming over to the wall. As my



and I was ready to jump in with them.  
Gearing up with all that extra

to spinning around and doing some dancing and twists in about 10m (30ft) and two seals came





CLOCKWISE FROM LEFT: One of the dives was under this waterfall along the cliffs of the Tasman Peninsula; Life on the wall under the waterfall; Diver in Cathedral Cavern; Draughtboard shark, also known as the Australian swellshark, is a species of catshark endemic to Southern Australia.

cavern and then turning around to look back at the opening. It always seems as if the ocean is at its bluest in this frame—I know, in reality, it is not any different in color, but I love the way the light and

dark hues of a cave or cavern structure can make the color of the ocean appear more intense. Admiring the view, we swam back out of the crack and proceeded along the wall to another

mask moved from air to water and my eyes refocused, I saw that the rock underwater had become covered in kelp. We swam into a large crack in the wall that could probably fit four divers side-by-side. With a flashlight, I could see that the wall's marine life changed completely inside the cavern. Yellow and orange

sponges and garden of yellow zoanthids coated the rock. A sleeping draughtboard shark, endemic to Southern Australia, was on a ridge. I stopped to take a few photos of this cute little shark, which is about a half meter long (2ft) and belongs to the cat shark family.

I love swimming into a cave or



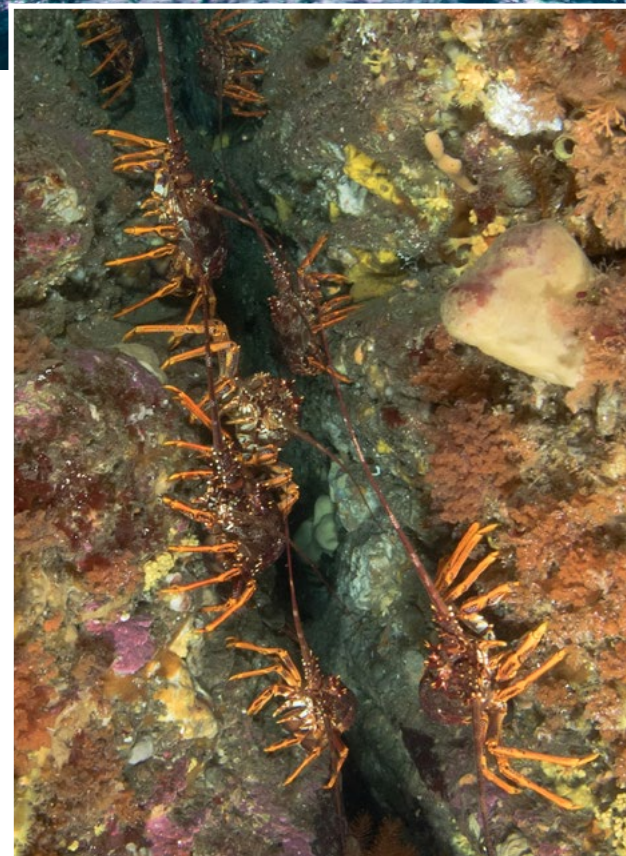
Yellow zoanthids found at Waterfall Bay



large opening. Depending on a diver's experience and desire, this cavern system can be extensively explored. I preferred to just check

out the entrances and continued exploring along the wall. Living up to its name, the second opening we came to was





Common dolphin swim alongside the boat in front of Australia's steepest cliffs on the Tasman Peninsula (above); Eight lobsters in a crevasse at Cathedral Caverns (left)

very cathedral-like, with multiple large arches. Swimming in and looking back, there were two large circles through which blue light penetrated. After taking a moment to absorb the view, we moved on.

Finding a large lobster, I snapped a photo. Just after that, I found a crevasse with eight lobsters, which I captured—all in one frame! One could easily spend hours and multiple dives in this area, but my chill-factor had reached its limit and it was time to go up.

During our surface interval, I contemplated where I was and how lucky I was to witness this sheer, raw beauty. It struck me how different the sea conditions were just two days ago, when

winds were gusting over 40 knots. Right now, the dark cobalt blue of the sea was almost like glass. I took in the striking beauty of the scenery, as the boat traveled below monstrous, jagged cliffs, with nothing for miles off in the distance.

As if the ocean read my mind and wanted to show me more, the smooth water was broken with a fin. And then another. A pod of common dolphins was playing around the boat. Gloves and fins back on, camera ready, we figured we would jump in and see if they would let us swim with them. You never know if you don't try.

Back in the chilly water, I reconsidered my decision until the dolphins glided past us. It was amazing.



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Common dolphins on the Tasman Peninsula





**Dragons**

Weedy seadragons are a critter that has been on my bucket list for years. On another dive around Waterfall Bay, Captain Mick dropped us off right under an actual waterfall (which seemed like a cool enough dive in itself—how many people can say they started a dive right under a waterfall?) I descended to the area our dive guide described where a dragon had been seen a few days before.

I found the sandy patch and the rock I was sure the dive guide was talking about and looked at the green, swaying kelp. And I looked some more. And I kept looking, swimming a little bit to the right and looking and then back to the left and still looking. It had to be here. Just as I was beginning to doubt the location, the dive guide came down, and from at least 10m away, pointed at the kelp. She had picked it out from what seemed like forever away, and I realized I had been looking right at it, but not seeing it.

Like something out of a children's fairy tale, these bizarre and magical creatures are just incredibly interesting to look at. It was also considerably larger than I expected and can grow up to 45cm (17 inches) long. I wanted to spend the whole dive just staring at it, trying to figure it out. Clearly it has

evolved to look like its kelp home—it even moves like kelp. Unlike their seahorse cousins, the seadragons do not have prehensile tails to hold themselves to something, leaving them to drift just like the kelp they impersonate. Also like their seahorse relatives, the males do the hard work of carrying the eggs, for about a month before fully-formed baby dragons hatch and begin a drift of their own.

This dragon was a male and I knew that because he had rows of perfectly pink eggs on his tail. Looking closely (and also zooming in and examining the photos post-dive) I could see some of the eggs had already hatched and were missing from the rows, and other still-intact eggs had tiny eyes looking out of the eggs, almost ready to be born. Seeing this incredible animal made my trip, and I requested to visit him for more photos the next day on another dive—where he was in the same place, and it still took me ages to find him!



THIS PAGE: Weedy seadragons live in the kelp under a waterfall in Waterfall Bay—they can grow up to 45cm (17in); Eggs (above) are carried on the underside of the male's tail





Kelp in Waterfall Bay (above); Blenny on reef off Tasman Peninsula (below)

**Port Arthur**

On my last dive day, the wind was blowing straight onto Waterfall Bay, so the dive staff trailered the boat

about a 30-minute drive south to Port Arthur. Protected by the wind, we dived two sites, which had sandy bottoms with kelp in patches.

I had a draughtboard shark swim right up to me, I found a flounder trying to disguise itself in the sand, and I saw several species of starfish and seabiscuits. It was neat to dive another slightly different topography after doing mostly cliff-wall dives at Eaglehawk Neck.

**Other dive sites**

The weather played a distinct role in what dive sites we visited while I was in Tasmania. I also saw photos, videos and heard about some of the

other fabulous dive sites in the area. A wreck that sunk in 1915, the SS Nord, has spectacular deep water sponge life. There are also several deep wall dive sites (The Sisters, The Thumbs and Deep Glen Bay), which the winds prevented us from visiting. These sites were supposed to have large schools of small fish such as butterfly perch, many invertebrates and large sponge gardens. It is always good to have something more to go back for...

**Eaglehawk Dive Centre**

There are a limited number of diving operations in Tasmania and Eaglehawk Dive Centre has been around for 25 years. I spent most of my time with two of the owners and operators, Karen Gowlett-Holmes



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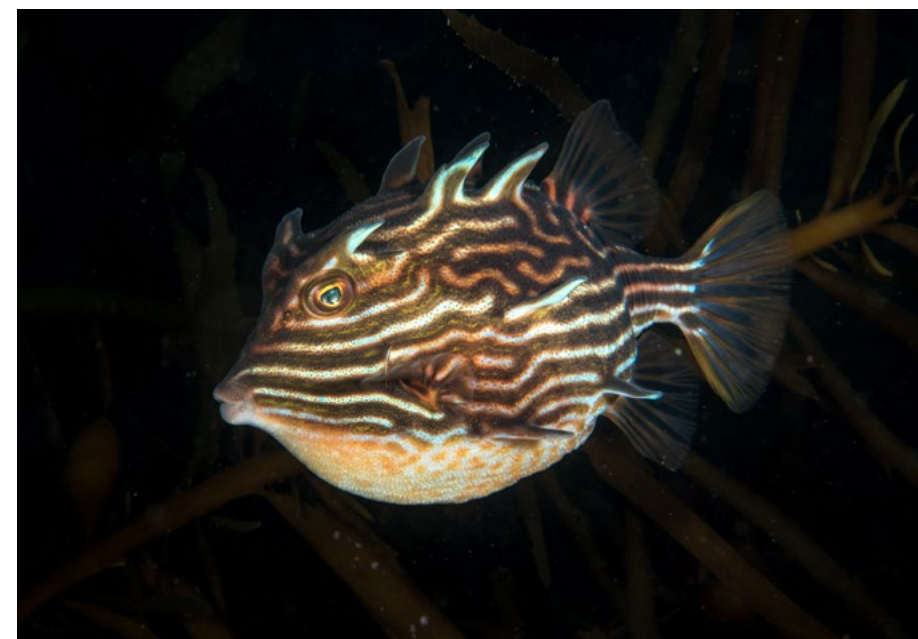
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CLOCKWISE FROM TOP LEFT: Draughtboard shark; Serrated hingebeak shrimp; Shaw's cowfish; Longsnout boarfish



and Captain Mick Baron, who are both knowledgeable ocean lovers. Beyond being lifelong divers and instructors, they are both also marine biologists. Karen is a renowned photographer as well as a marine invertebrate biologist. Her book, *A Field Guide to the Marine Invertebrates of South Australia*, is the local identification-bible of the region, and she continues to do research and work as a scientific adviser.

Diving with people who care about the local environment and are also the experts, scientifically, on the region, made the dive experience even better. The dive center is also carbon neutral and has received the PADI Green Star award, given for dedication to conservation. It is a special experience to dive with operations dedicated to the health and conservation of our

oceans and an added bonus when they can tell you about the marine life too.

### Food and lodging

Eaglehawk Dive Centre has a low-budget, cozy bunkhouse at the dive shop. It has two rooms of six bunk beds and a private room upstairs. There is a shared kitchen and a nice outside deck area. They also allow camping on the property with use of facilities for a small fee. There is a hotel in Eaglehawk Neck with a full restaurant and bar, and there are several B&B options in the area.

Like all of Tasmania, I found fantas-

tic food around the Tasman Peninsula. My favorite spot was The Fat Quoll, which had excellent wood-fired pizzas. Port Arthur Lavender was a great place to visit to see a lavender farm and also had a fantastic café with yummy soups (perfect to help warm up); café-like selections of scones, cakes and pastries, many with lavender-flavored options; and

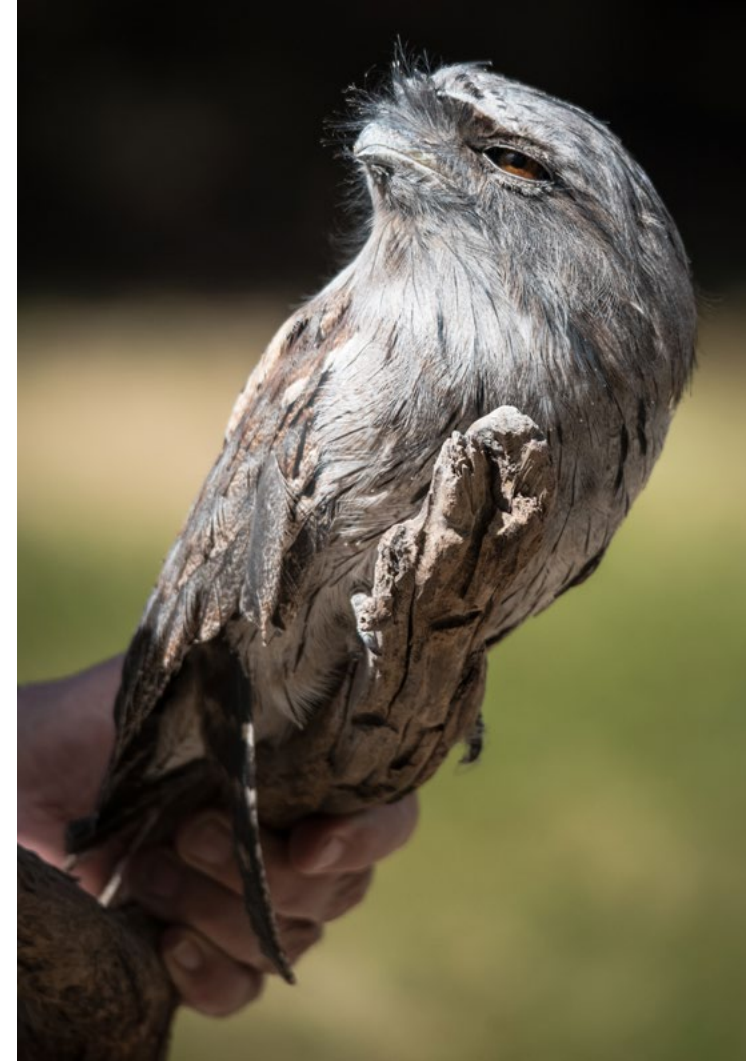
dinner selections. Don't miss their lavender hot chocolate either. North of Eaglehawk Neck, the Bangor Wine and Oyster Shed had, as you can guess, excellent wine and oysters as well as other lite fares.

### Tasmanian Devil Unzoo

A trip to anywhere in Australia is not complete without a visit to see the local wildlife

and Tasmania is no different. However, Tasmania is different in that much of its local wildlife is abundant and roaming around the island. Each night at the dive center, pademelons—an endemic small kangaroo species—and wallabies came out right in front of the bunkhouse, and down at the beach in Pirate's Bay, I watched tiny fairy penguins come





# Tasmania

THIS PAGE: Wildlife native to Australia at the Tasmania Devil Unzoo. Feeding kangaroos (far left); Tawny frogmouth owl (left) can grow up to 53cm (21in) long; Tasmanian devils (below and far lower left); Pacific gull (center inset)



parcs, the Unzoo aims to make its facility as open to the local wildlife as possible. They also take in sick and injured animals, in hopes of rehabilitating them and releasing them back into the wild if possible. Having spent several hours viewing the park with founder, John Hamilton, it was fantastic to see the park's dedication to the wildlife of Tasmania, particularly the devils.

although they are fed and maintain quite a nice lifestyle in the Unzoo. So it does make sense why they stay. The key is to make sure the animals have the best lives possible in the zoo, and that the human visitors can see them in a natural environment and in a memorable way.



Tasmanian devils are endemic and only found in the wild on Tasmania. This icon of the island unfortunately is in trouble. Starting in the 1990s, several devils were seen with facial tumors that seemed to be spreading to other animals. Through extensive research, it was discovered that these tumors are actually a viral cancer that is spread from devil to devil through bites, which are

a natural behavior of the devils. The disease has spread and devils have since been placed on the IUCN Endangered Species Red List. The future looks challenging for the devils. Programs such as those at the Unzoo and others throughout Australia have stepped up to the challenge to save their iconic Tasmanian devils.

out of their burrows right after sunset.

I had the privilege of visiting the Tasmania Devil Unzoo, just down the road from Eaglehawk Dive Centre, to get up close with the locals, including the nocturnal and elusive Tasmanian devil. A unique concept in typical zoos or wildlife

According to their website, "The Unzoo is a reversal of the traditional concept of a zoo." They aim to "immerse human visitors in as close to a natural environment as possible." Wild animals wander about the park and many of the "resident" animals are not enclosed, so they could leave if they desired,







THIS PAGE: Pennicott Wilderness Tours takes tourists on a Tasman Island cruise along the cliffs of the Tasman Peninsula, Australia's steepest cliffs (above and top right); Colony of Australian fur seals (right); View of the Totem Pole, Tasman Peninsula (far right)

**Tasman island cruise**

I might have mentioned it was a little windy during my visit to Tasmania. There was one day the dive boat did not go out, so I checked out another boat, the Tasman Island Cruise, part of Pennicott Wilderness Journeys. These guys operate year-round, in all sorts of weather (as long as it is safe, of course), and I set out for a "three-hour cruise" with them in one of their 12.5m inflatable, ridged-hull, yellow boats to explore the coastline of the Tasman National Park.

Upon arriving, I saw they were selling gloves, beanies and thick wool socks. Given the strong winds and frosty temperatures, I decided to invest in these. The

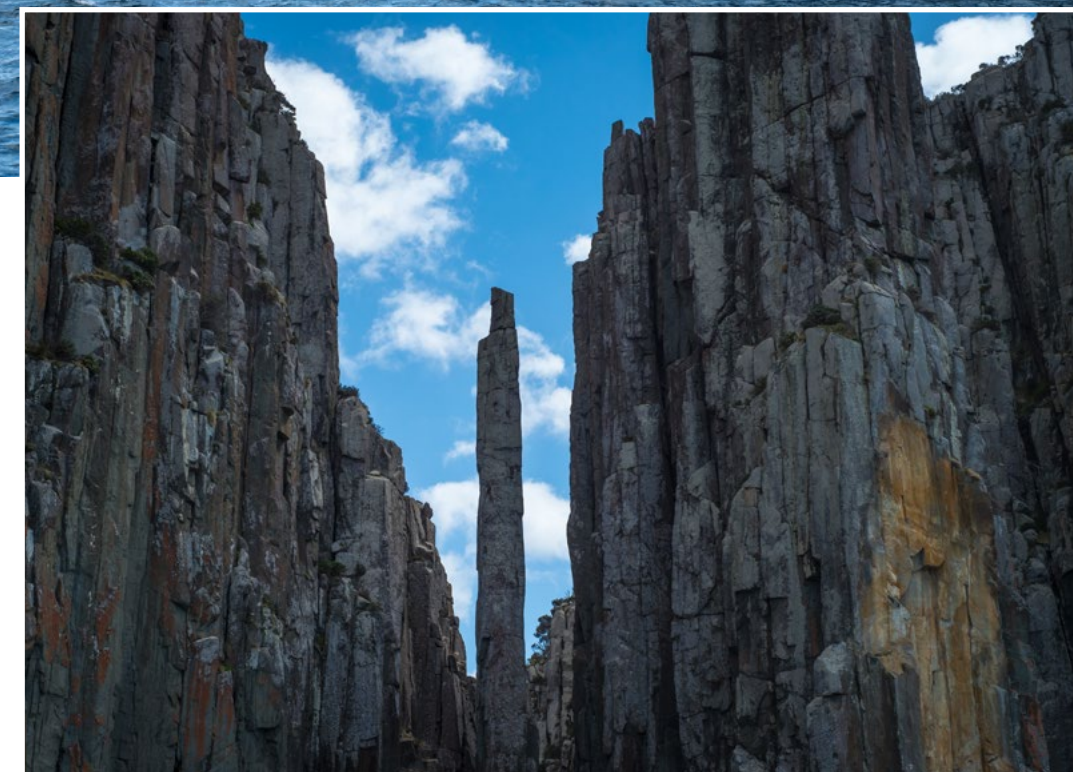
staff provided us with full-length raincoats with hoods on the boat, and I knew this was going to be another adventure in testing my cold-tolerance.

It was great fun though. The fast and maneuverable boat raced along the cliff faces and took us below the arches and back into caves. We saw the fur seal colony I had dived with a few days prior, an Australian fur seal colony and lots of birds.

The captain and crew were knowledgeable in the geology



of Tasmania and the wildlife, and learning about the island while seeing it up close was wonderful. The boat also took us past Totem



other formations and climbing up this sea-stack is popular with the toughest of rock climbers and abseilers.

Pennicott Wilderness Journeys are also 100 percent carbon-offset and practice efficient fuel, energy and water use. They also actively contribute to coastal

conservation projects and more, making them an excellent choice for tours, both sustainably and because of their excellent service and exciting tours.

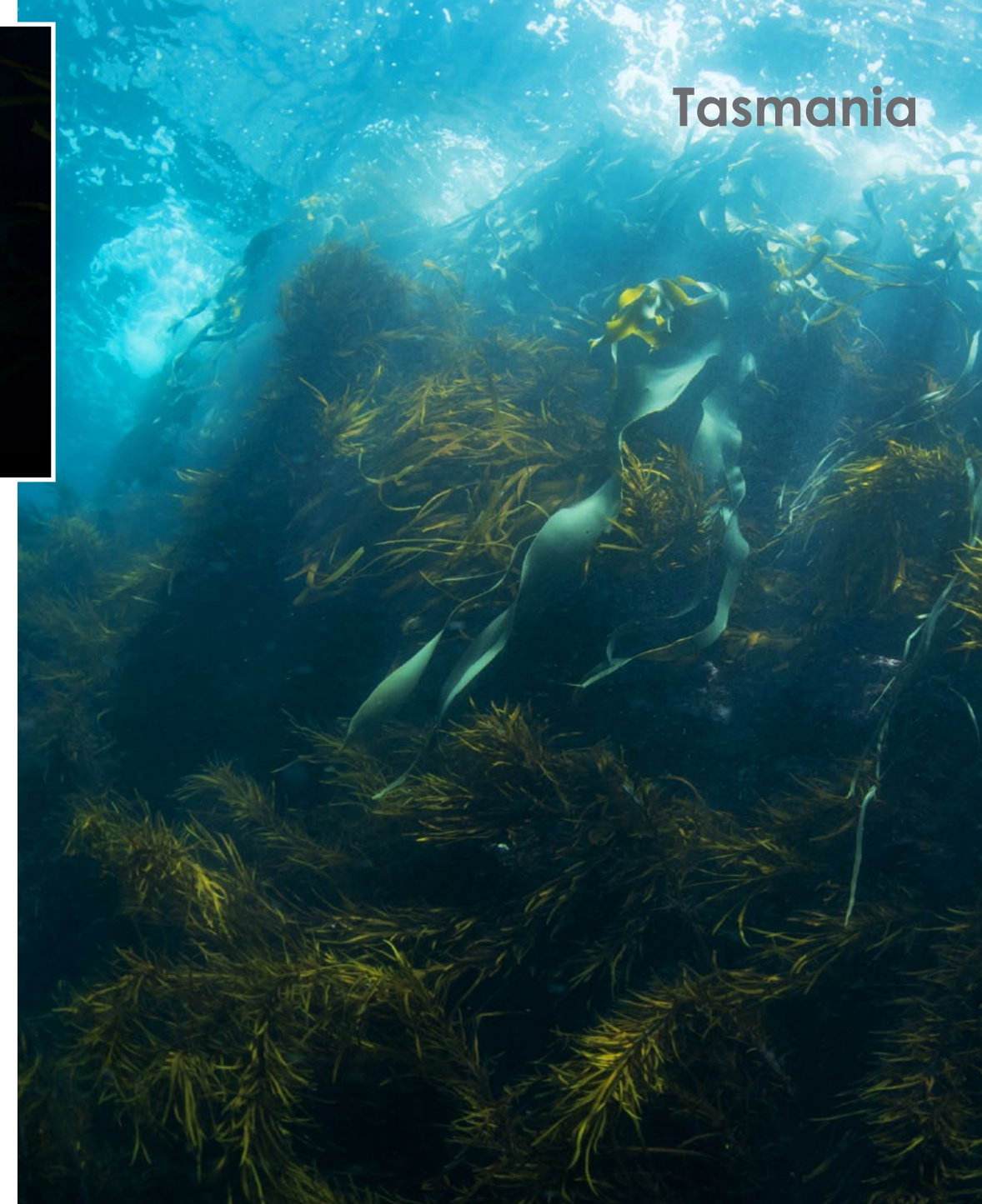
**A changing environment**

Climate change and increasing water temperatures was not a





CLOCKWISE FROM LEFT:  
Tunicates; Southern leather-jacket fish; Kelp at Waterfall Bay; Small kelp or spider crab; Shaw's cowfish in kelp forest



I hesitate to bring it up, because I do not want to deter you from diving in Tasmania, but the giant kelp forests of Tasman Island are almost gone. They

topic I expected to be discussing while wearing 14mm of neoprene having just returned from a 14°C (55°F) degree dive to an even chillier air temperature. But just like the tropics (and everywhere else), Tasmania is seeing changes too. Mick and Karen can tell you what they have seen in over 25 years of diving this area because they have watched it happen.

have been decreasing for years, and after a severe El Niño in 2015-2016 during which water temperatures were some of the highest sustained ever recorded, the kelp decreased in size drastically. To make things even worse, during the 2016 winter season, a large storm damaged already ailing kelp. Die-offs, decreases in abundance, and even damage from

storms have been seen before, but the kelp has always come back the next year. This year, the dive staff have found almost no giant kelp anywhere. Obviously, it has only been a year, and maybe, in a few more years, it will recover. But this lack of any regrowth the following year seems problematic.

For boaters, who have recently had to maneuver around the kelp to keep it out of their propellers, the lack of kelp may make their lives a little easier. But for the creatures, which call the kelp home such as the beloved weedy seadragon, it is not good. Like so many places around the world, future changes in the marine environment are unknown, but even these chilly waters are being impacted, and the effects are likely negative.

Do not let the lack of kelp derail your visit though, because I still

found the diving beautiful and full of life. While the giant kelp is absent, there are still other types of kelp and seaweed that make you feel as if you are diving in an enchanted forest. Between the kelp, the coral and the sponges, the dive sites I saw were completely coated with green, yellow and orange. There were plenty of starfish, seabiscuits and plenty of other invertebrates, along with lots of fish, draughtboard sharks, weedy seadragons and seals. I thoroughly enjoyed the diving (although next time I am bringing a drysuit) and I look forward to returning to experience more of Tasmania's wilderness above and below the waves. ■

Special thanks go to Karen Gowllett-Holmes and Captain Mick Baron of Eaglehawk Dive Centre ([Eaglehawkdive.com.au](http://Eaglehawkdive.com.au)), John Hamilton of Tasmanian Devil Zoo ([Tasmaniandevilunzoo.com.au](http://Tasmaniandevilunzoo.com.au)), Pennicott Wilderness Journeys ([Pennicottjourneys.com.au](http://Pennicottjourneys.com.au)) and Tasman National Park ([Parks.tas.gov.au](http://Parks.tas.gov.au)).

Brandi Mueller is a PADI IDC Staff Instructor and boat captain living in the Marshall Islands. When she's not teaching scuba or driving

boats, she's most happy traveling and being underwater with a camera. For more information, visit: [Brandiunderwater.com](http://Brandiunderwater.com).

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# fact file



## Tasmania, Australia



SOURCES: US CIA WORLD FACTBOOK, BBC, DISCOVER TASMANIA, LONELY PLANET, WIKIPEDIA

**History** The island of Tasmania is thought to have been connected to mainland Australia via a land bridge until around 10,000 years ago and was inhabited by Aborigines for 40,000 years before colonization. In the 17th century, the first European explorers visited Tasmania and Abel Tasman named it Van Diemen's Land. James Cook named it for Great Britain in 1777 and it became a popular sealing and whaling island. In 1803, Tasmania became the second British Colony after Sydney and a penal settlement was created with over 75,000 convicts being sent there until 1853. The Port Arthur prison complex was open until 1877. Tas-

manian Aborigines were almost completely decimated by new infectious diseases introduced by the colonists and violent guerrilla warfare. The few that survived were forcefully moved to Flinders Island where many more continued to succumb to disease and malnourishment. In 1901, Tasmania became part of the Commonwealth of Australia. In 2008, a formal apology was issued in parliament by Prime Minister Kevin Rudd to the Aborigines for policies and laws that "inflicted profound grief, suffering and loss". Government: Australia is a Commonwealth realm with a parliamentary democracy under a constitutional monarchy. Capital of state of Tasmania: Hobart.

**Geography** Tasmania is an island state 240km (150 miles) south of mainland Australia. It is 68,401km sq (26,410 sq mi) with 334 islands surrounding it and 4,882km (3,033 miles)



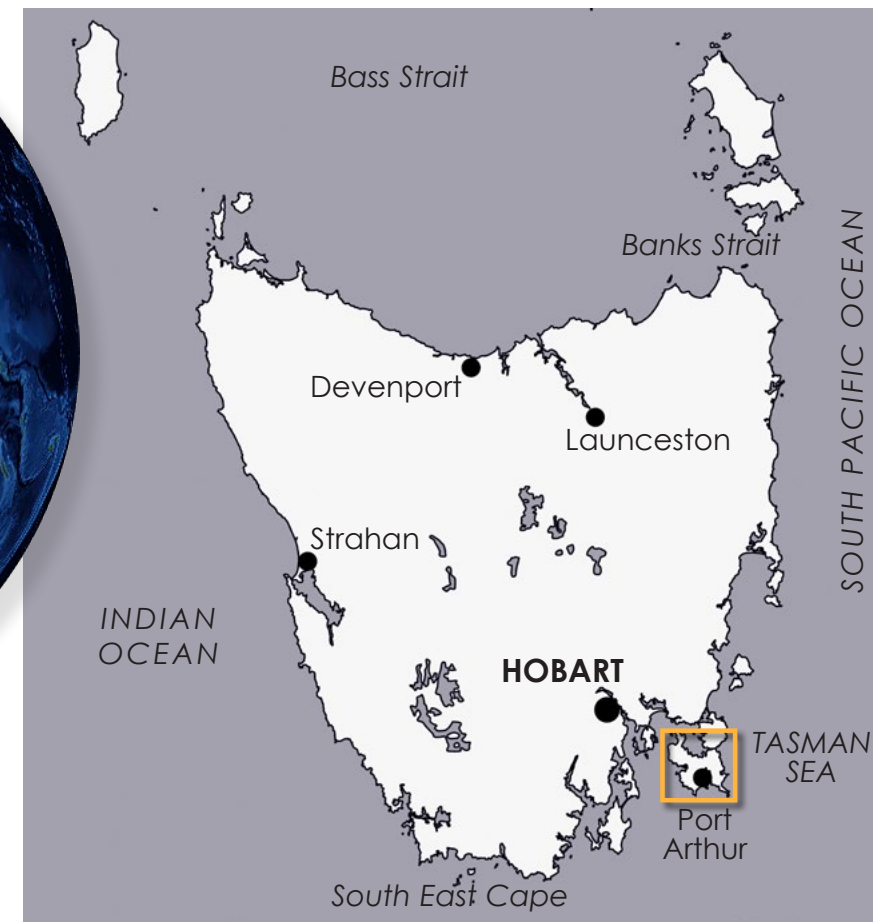
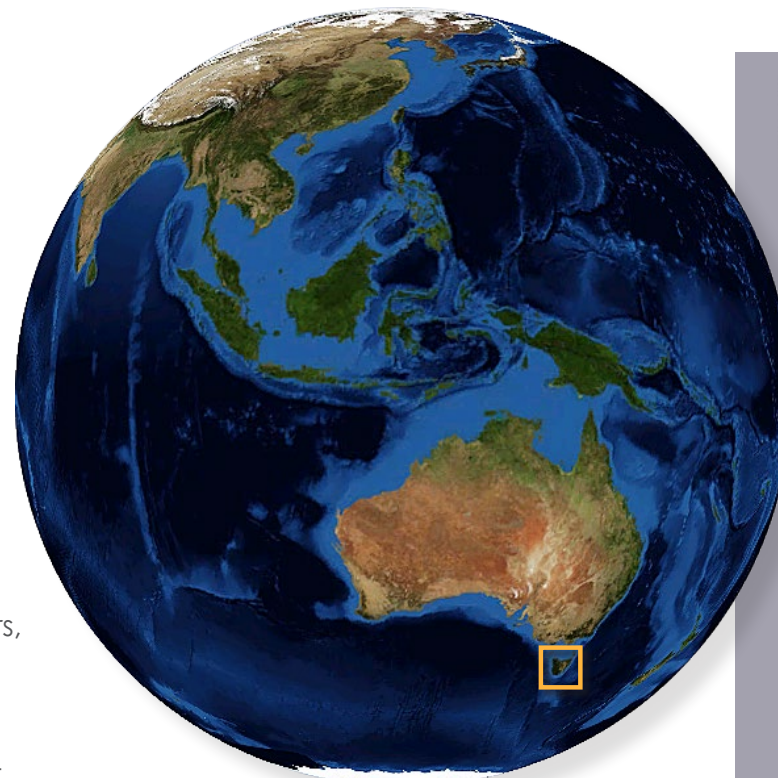
Firebrick seastar

of coastline. The mountainous island was carved out by glaciers, which have created stunning cliffs, arches, mountains, lakes, rivers and waterfalls. Tasmania is home to cool temperate rainforests covering about 10 percent of the island. The island is directly in the path of the "Roaring Forties" winds.

Much of Tasmania is protected with almost 45 percent national parks and reserves. There are 19 national parks and the Tasmanian Wilderness World Heritage Area covers about 20 percent of the island (1,584,000 hectares). Tasmania has a unique ecology above and below. Due to geographic isolation, Tasmania has many endemic and unique flora and fauna both above water and below.

**Environmental issues** Tasmania is passionate about the environment. It understands the importance of its island's natural beauty and resources and often rises up at the forefront of environmental politics for the country of Australia. Look closely and you will find many nonprofit environmental protection groups fighting for both marine and terrestrial projects. Issues affecting Tasmania include over-fishing and fishing practices, climate change, invasive species introduction, deforestation, urbanization, among others.

RIGHT: Global map with location of Tasmania  
FAR RIGHT: Location of Tasman Peninsula on map of Tasmania



NORDINORDWEST/WIKIPEDIA / CC BY-SA 3.0 DE

**Economy** Tasmania's main economy comes from mining, agriculture, forestry and tourism.

**Climate** Tasmania has a cool, temperate climate with the summer months, December-February having air temperatures from 21-24°C (70-75°F) and winter months, June-August, having temperatures of 3-12°C (37-54°F). Water temperatures reach a high of around 15°C (59°F) in the summer and can get as low as 12°C (54°F) in the winter. There is more rainfall in the winter although the western side of the island receives more rain year-round than the eastern side of the island. Weather conditions can change quickly and dramatically and cold fronts and strong winds can occur especially in winter.

**Population** 518,500, with 40 percent residing in Hobart.

**Currency** Australian Dollar (AUD). Exchange rates: 1USD=1.32AUD, 1EUR=1.39AUD, 1GBP=1.60AUD, SGD=0.93AUD

**Language** English

**Health & security** Tasmania is generally safe, although petty crimes can occur. Tap water is safe to drink and there is no malaria, dengue, or Zika. Check with your state department for up-to-date travel warnings.

**Diving season** Diving can occur year round, but the Austral summer is the warmest time to go. December through January are the most popular diving times, although in the winter months visibility is better and offshore winds make accessing some dive sites easier.

**Getting there** Tasmania does receive international flights (except from Antarctica), so all flights come from mainland Australia from either Jetstar, Qantas or Virgin Australia. Hobart has the largest airport, but there are also airports in Launceston, Burnie, King Island and Devonport. The Spirit of Tasmania is a car and passen-

ger ferry that sails at least twice daily between Melbourne and Launceston. There is an island-wide bus system that is reliable but does not run very often.

The best way to get to Eaglehawk Neck is by car. Rental car agencies can be found at the airports and larger towns, but check which countries' driver's licenses are valid or whether an international driver's license is required to rent a vehicle.

**Visa** All visitors, except New Zealanders, must apply online for an ETA or eVisitor visa, which permits a three-month stay.

**Decompression chambers** The Royal Hobart Hospital has a hyperbaric chamber in Hobart, about an hour drive from Eaglehawk Neck.

**Web sites** Tourism Tasmania  
[DiscoverTasmania.com.au](http://DiscoverTasmania.com.au) ■



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Edited by  
Rosemary E. Lunn

# Equipment

## Fourth Element Riga Jumper

The daffodils are out, but it's not t-shirt weather yet. A warm winter jumper is certainly still de rigueur for many men. One design favored by many is the fisherman's jumper. This is traditionally knitted with a rib stitch because it creates a chunky, thick fabric, with lots of horizontal stretch and volume—just the thing when the mercury drops and you need something to fend off the cold. Fourth Element's classic version is called the Riga (named after Latvia's capital city "because it's jolly cold there"). The high-quality blend of 60% fine Merino wool and 40% acrylic makes a fashionable jumper with raglan sleeves, hence, the wearer has greater movement. The dark gray Marl Riga comes in five sizes and is finished with a funky leather Fourth Element logo patch. [FourthElement.com](http://FourthElement.com)



## Dive Rite Nomad LS

With 20+ years of sidemount R&D behind them, Dive Rite manufactures systems that work. Its latest version—the Nomad LS—was showcased at DEMA 2016. Dive Rite has utilized a series of baffles to ensure the air in the custom-made bladder stays below the waist, towards the hip and butt area. This unique design also ensures a streamlined, low profile system, reducing drag in the 15.8kg (35lb) lift diamond-shaped wing. Dive Rite has totally revisited its bungee system, giving divers choice. Now divers can dive it as is, take off the rings and have a loop bungee with a snap, or simply remove all of the hardware and just dive bungee. This system has also been tweaked to fit smaller divers. The top of the wing is tapered, whilst the shoulder straps sit closer together on the torso. [DiveRite.com](http://DiveRite.com)



## Suunto Apnea Computer

The Suunto D4f is specifically designed for apnea divers and water sports enthusiasts. It takes its inspi-

ration from the D4i model. However, it is not a decompression computer, nor does it have an air integration function. It is an advanced freediving wrist computer. Therefore, it is more competitively priced than the D4i. This device provides freedivers with accurate bottom times, dive times, present and maximum depth, surface intervals, alarms when required and a log book. It also features an apnea timer to improve your breathing technique. It comes with a comfortable elastomer strap, and the diver has the option of buying a USB cable to upload dives to DM5 and Suunto Movescount. [Suunto.com](http://Suunto.com)



## Scubapro S620Ti

For 16 years, the S600 has been Scubapro's best selling second stage, worldwide. Therefore, the replacement has got to be something special. Scubapro has preserved the look of the S600 and extensively reviewed the model to create the S620 Ti. This cold water regulator is smaller and lighter than the S600, and it has a 37 percent improvement on "work of breathing", too. Scubapro has reviewed how we exhale and created a longer exhaust tee that reduces the effort of exhalation. Then they looked at how we inhale and made the mouthpiece pipe larger to improve airflow and mouth comfort. The only downside we can see is the compact "Hi-Flow" mouthpiece. This is smaller and exclusive to the S620 Ti, so if you are in the habit of chewing mouthpieces, you had better carry a spare one. [Scubapro.com](http://Scubapro.com)



## Light Monkey Cave Cookie

British cave divers traditionally used a clothes peg as a line marker. Recently, this form of line marker has been replaced by a "cave cookie". Divers in North America believe the disc resembles a biscuit, hence the nickname "cookie". A cookie is a non-direction marker used to mark a specific spot on a line in a cave. Alternatively, individuals can place a cookie on the line to help identify who is still on the line, should the team get separated. Light Monkey is now manufacturing Delrin cave cookies. This is a stronger, more durable material than plastic injection moulded plastic. Therefore, the laser cut cookie should not bend or snap. Light Monkey has also stated that it is possible to get your cookies personally engraved, too. [LightMonkey.us](http://LightMonkey.us)





# Aqua Lung sold to private equity firm

Text by Rosemary E Lunn

**It is probably fair to say that scuba diving began in earnest in 1946.**

It was the year that Air Liquide, along with Jacques Cousteau and Emile Gagnan founded La Spirotechnique. This company conceived, designed and manufactured a range of scuba diving equipment, including some of the first commercially available regulators. Their first modern Aqua Lung, or regulator, was the CG45.

Two years later in 1948, Rene Bussoz, a relative of Cousteau based in California, signed a five-year con-

tract with L'Air Liquide to import scuba equipment into the United States. Bussoz was a smart man. He changed the name "La Spirotechnique" to "US Divers" and registered the name "Aqua Lung." When his contract was not renewed, Bussoz sold his company and the trademark, Aqua Lung, back to the French company.

## Acquisitions

We now jump forward to 1997, when Aqua Lung acquired Apeks.

This British scuba diving manufacturer (founded in 1974) primarily focused

on designing and building a range of regulators that perform in all climates.

*We invest and work in partnership with a company's management team so that, together, we can maximise the value of our investment by unlocking a business' full potential.*

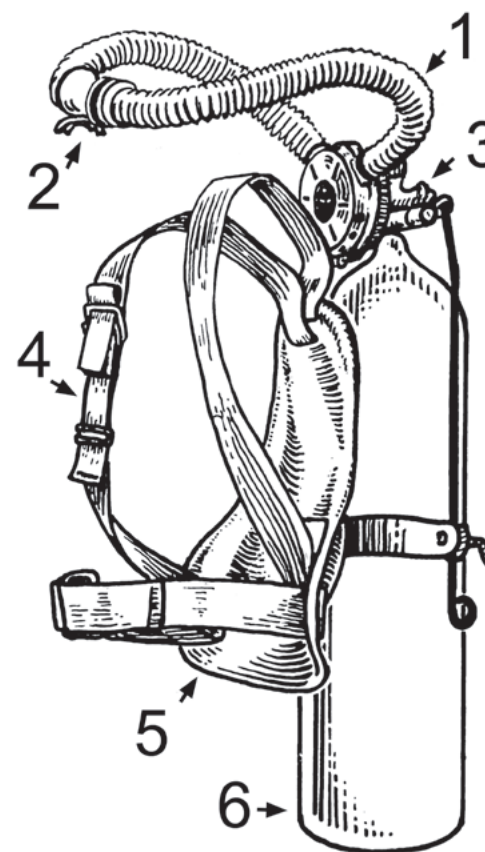
Just over a decade later, in 2010, Aqua Lung bought Whites Manufacturing—a Canadian drysuit manufacturer. And so, the Aqua Lung group of companies grew to include Apeks, Aqua Sphere, La Spirotechnique, Pelagic, Seaquest, Technisub and US Divers—gaining global recognition as the company success-

fully forayed into several other aquatic equipment markets (including free diving, snorkelling, fitness and competition swimming).

## Sale

Then on 4 October 2016, a European private equity firm (Montagu Private Equity) announced that it had "entered exclusive negotiations with Air Liquide for the potential acquisition of Aqua Lung". By now, the Aqua

"Air Liquide has a strong historical attachment to the business, but it's not core," Liberum analyst Adam Collins told Bloomberg at the time when Aqua Lung was put up for sale. "There is no strategic rationale in being part of the business." Air Liquide is one of the largest global suppliers of gases to big industrial installations, like refineries, as well as to hospitals and patients.



Lung group employed 1,000 staff in more than 90 countries across the world, generating approximately €200 million in 2015.

As 2016 came to a close, Air Liquide announced that they had completed the sale of the pioneering firm, Aqua Lung, to Montagu Private Equity on Friday, 30 December 2016. Whilst the terms of the transaction have not been disclosed, rumours in the industry indicate that the Aqua Lung group was sold for approximately US\$400 million. As with all rumours, this figure should be taken with a pinch of salt.

So what can we expect in the future for Aqua Lung? Montagu Private Equity business plans to buy other businesses and "maximise investor value". Interpret this statement accordingly. We are all in for an interesting time, it would seem. ■



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# opinion

Text by Simon Pridmore  
Photos by Scott Bennett

**In this issue, Simon Pridmore takes a look at the buddy system and concludes that on many occasions your buddy is not your friend, and you would be much better off assuming that this will be the case and preparing yourself, always, to assume full responsibility for your diving.**

The buddy system, as it was originally conceived, was a procedure whereby two confident divers operate as independent members of a two-person team—with their shared equipment, experience and gas supply—making the team stronger and safer than its individual members acting alone.

### The perfect buddy team

In the perfect buddy team, divers share similar interests and have compatible aims for their diving. They stay together throughout every dive, maintaining a commonly agreed position relative to one another, remaining in visual contact



*Scuba Confidential:*

# You are on your own!

*— A Hard Look at the Buddy System*

and adjusting their distance depending on the prevailing visibility and water conditions.

They discuss and practice what to do in the event of various emergencies and equip themselves accordingly. They each

accept full responsibility for the conduct of their own dive as well as the additional responsibility of helping out if their buddy runs into difficulty or suffers equipment failure. They have their buddy's well-being and satisfaction with the dive

at the forefront of their mind alongside their own. Finally, they agree that, should either of them feel ill at ease for any reason before or during a dive, they will abandon or immediately abort the dive together, with no questions asked.

It is hard to argue that this is not the safest way for people to scuba dive.

### Not everyone is perfect

But the buddy system does not suit everyone. In reality, not many of us are fortu-







nate to have found the perfect dive partner and be able to dive with this person all the time. It is also naive to expect that one diver can immediately develop this sort of symbiotic relationship with another diver simply by being paired up with them at random.

Yet, this is what commonly happens in organized sport diving, where many operators act as if, just by instructing two divers to dive together, you thereby create a buddy team. On the contrary, this sort of policy can cause misunderstandings or bad feelings, and generate scenarios that place divers at risk.

For example, there are many divers who object to being told that diving alone or as part of a loose group is not permitted. However, when forced to accept a buddy by the operator they are diving with, they will not say anything, as they know they will not be allowed to dive at all if they refuse. So, they just adopt a policy of passive resistance and remain silent. However, they have no intention of taking any notice of their buddy at all once they are underwater.

This produces one of two results: either the two divers each go their own way, deliberately refusing to acknowledge the other's existence, or one diver just ends up resentfully following the other around, largely ignored but unilaterally ensuring they stay together. There is absolutely no safety benefit at all in either case. Both divers would be much less stressed and much more willing and able to help each other if the buddy system had never been mentioned and if they had just been allowed to dive as self-sufficient members of a loose group in the first place.

Other divers will seek out operators that enforce a buddy protocol and abuse the system by choosing to interpret it as an op-

portunity to absolve themselves completely of responsibility for their dive and place the burden entirely on the shoulders of another diver. Their companion will often have no idea that they are playing this role.

Sometimes, two people with this mindset unwittingly end up diving together, a sure-fire recipe for disaster as, even if something minor goes wrong, the stress of the event will be compounded when they both realize that, far from having someone close by to save them, each of them is effectively alone.

### Divers die alone

Defenders of the buddy system argue that a diver is more likely to come to harm if they are alone than if they are with another diver. The statistics support this contention, showing that most divers who die diving, indeed do die alone. However, a closer examination of the reports shows that, in most

cases, the diver who came to grief did not actually start the dive on their own.

Sometimes, problems occur when one diver has a problem and the other leaves them to surface alone. Or they ascend together, but then one descends again to continue the dive solo. Inattention and indifference can also leave a diver isolated. This happens, for instance, when one diver leads from the front, forgets to look back, and does not notice when the diver behind develops a problem.

Simply pairing divers up, therefore, is not a universal panacea.

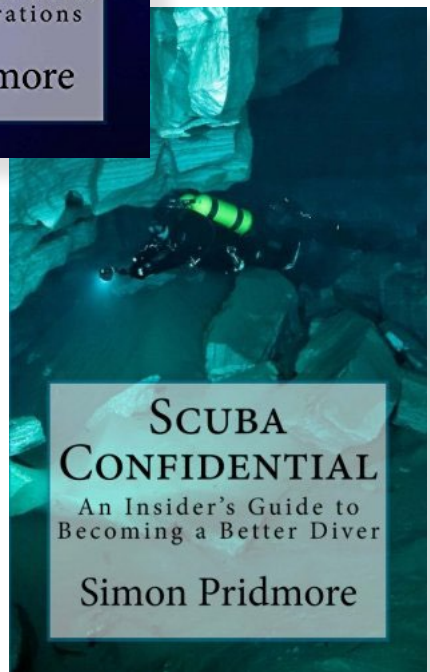
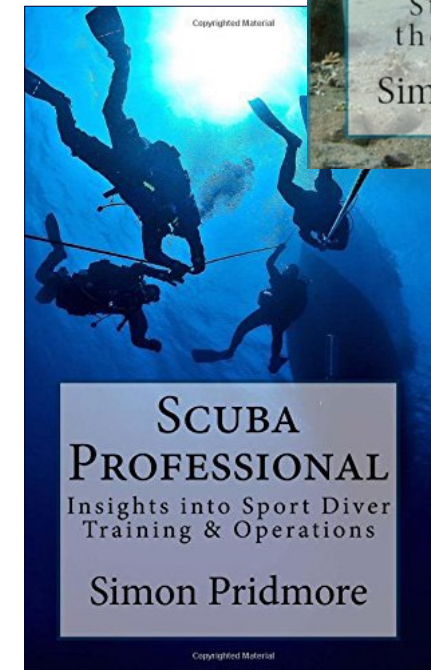
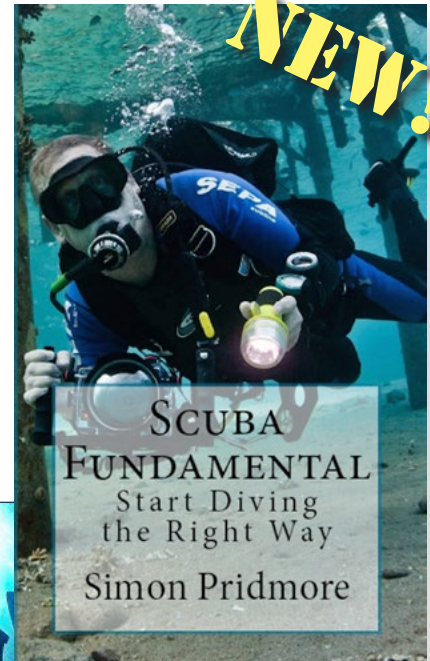
### Going solo

It may sound strange, but many problems with the buddy system would be solved if all divers were capable of solo diving and allowed to dive solo. Now, when I say "solo", I am not suggesting that people should scuba dive alone, aloof and unapproachable. Hu-

*What I mean by solo diving, rather, is an approach whereby you dive in a team of two, three or more but prepare for every dive as if you are diving alone and never undertake any dive that you would not be completely comfortable doing on your own. The concept is that you, and only you, are ultimately responsible for your safety on every dive.*

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# opinion

man beings—and divers, in particular—are social animals. We like to share our experiences and we also derive a great deal of valuable emotional security from the company of others. There are a number of circumstances, too, when it is very useful to have another diver around—for example, if you lose your mask or get stung by marine life.



What I mean by solo diving, rather, is an approach whereby you dive in a team of two, three or more but prepare for every dive as if you are diving alone and never undertake any dive that you would not be completely comfortable doing on your own. The concept is that you, and only you, are ultimately responsible for your safety on every dive. You never put yourself in a position where you are not able to survive a dive by trusting your own knowledge, equipment and self-rescue skills, whatever happens.

### Equipment thoughts

This approach involves carry-

ing self-rescue equipment, a cutting tool and devices like a light, a whistle and a delayed surface marker buoy. It also involves having an accurate idea of your air consumption rate and making sure that you are prepared to deal with an out-of-air emergency, a regulator free-flow or a blown hose or O-ring, occurring at any point in the dive. On deeper dives, this will mean you need to carry a genuine alternate air source, such as a pony bottle.

### Solo mindset

Most importantly, you have to adopt a solo diving mindset. A key prerequisite for this is honest introspection. Before you embark on any dive—whether alone, with a partner or in a group—you need to be able to conduct an objective, truthful assessment of your own capabilities and state of mind. Here is a short checklist.

You only commit to doing any dive if ALL the following circumstances apply:

- You genuinely want to do the dive.
- You have identified all the potential risks.
- You are equipped to deal with anything that might happen.
- You have practiced what you will do in the event of an emergency.
- You have real-life experience of successfully handling stress underwater on similar dives.
- You have the discipline to stay within the dive plan.
- You have the discipline to resist following another diver who does not abide by the dive plan.
- You have the discipline NOT to change the plan on a narcosis-fueled whim halfway through the dive.
- AND you have the discipline to abort a dive as soon as something goes wrong or you feel ill at ease.

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opinion



Here are three examples to illustrate what I mean by "the discipline to abort":

**Example #1:** You are on a night dive when one of your two lights fails and you switch to your back-up light. You abort the dive at this point because you are now diving with one light and if that fails too, you have none.

**Example #2:** You are coming out of a shipwreck recovering your reel and line when the line jams around the reel. You now have two problems, the reel and the decompression clock. Rather than sit at depth trying to unjam the line, you tie the reel off and follow the line out of the wreck, keeping to your dive plan. You can always do another dive to

recover the reel later when you do not have a decompression burden and such a limited gas supply.

**Example #3:** You are on a deep dive when you begin to develop a sensation that something is wrong, although you cannot identify a specific problem. Rather than continue and hope the feeling goes away, you cut short your dive and concentrate even harder than usual on executing a perfect ascent.

**Solo is safer**  
By adopting solo diving techniques, you make yourself immune to the vagaries of the buddy system. Instructors can also teach

their students these techniques and make sure they do not perceive the buddy system as an excuse for not taking responsibility for their own dive. Then perhaps, with more solo-capable individuals around, operators will trust divers more and stop enforcing a system that just does not work. ■

*Simon Pridmore is the author of the international bestsellers, Scuba Confidential: An Insider's Guide to Becoming a Better Diver, Scuba Professional: Insights into Sport Diver Training and Operations and Scuba Fundamental: Start Diving the Right Way. He is also the co-author of diving and snorkeling guides to Bali and Raja Ampat and Northeast Indonesia. This article is adapted from a chapter in Scuba Confidential. For more information, visit: [SimonPridmore.com](http://SimonPridmore.com).*

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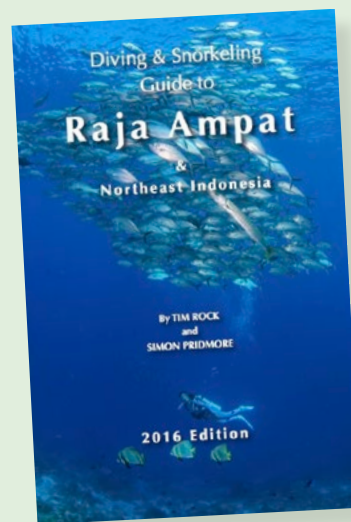
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## New Dive Guide to Raja Ampat



As part of their series of 2016 Diving and Snorkeling Guides, authors Tim Rock and Simon Pridmore have produced a brand new guide to Raja Ampat and Northeast Indonesia.

Diving or snorkeling in this remote region at the edge of the Pacific Ocean is a life-affirming, bucket-list-topping

experience! Abundantly rich in marine life, these seas are proving to be a gift for divers that keeps on giving. Raja Ampat is the superstar destination, but other areas such as Cenderawasih Bay, Triton Bay and Southwest Halmahera are shining brightly too and acquiring similarly mythical status.

This richly illustrated, detailed and informative guide is the first to cover all of these incredible places! It tells and shows you—the adventurous travelling diver—what to expect from this remote, fascinating and often downright astonishing part of the world. It will help you plan your trip, enhance your experience when you get there and provide you with the best possible souvenir of your visit. Available on [Amazon.com](http://Amazon.com)



*Diving with Dinosaurs*

# Galápagos Marine Iguanas

Text and photos by  
Steve Rosenberg







Marine iguanas will turn their heads to the side while feeding, using the rows of teeth on either side of their mouths to grab as much algae as possible in each bite, Cabo Douglas, Fernandina Island.

**The Galápagos archipelago, a chain of islands in the Pacific Ocean about 600 miles off the coast of Ecuador, is like no other place on earth. More than a hundred islets, rocks and 13 main islands make up the Galápagos. It is home to strange creatures found nowhere else. This is one of the few places in the world where you can scuba dive and snorkel with animals which remind one of the dinosaurs of ages past.**

The marine iguana (*Amblyrhynchus cristatus*), found only in the

Galápagos Islands, is a marine reptile that closely resembles the movie adaptation of Godzilla. It has the unique ability among modern lizards to forage for food in the sea. These iguanas have spread to all the islands in the archipelago, living mainly on the rocky shorelines around all of the islands.

The ancestors of marine iguanas were probably a species of land lizards. The marine iguanas range in size from eight to 14 inches. They are not very agile on land, but are incredibly graceful swimmers. The subspecies of the marine iguanas in the archipelago are identifiable by their sizes as well as distinct colorations. For example, the Española subspecies is redder while the Santiago iguanas are greener. The iguanas found on Fernandina

and Isabela islands are the largest iguanas that can be found in the Galápagos.

### Cabo Douglas

One of the best dive sites to interact with and photograph marine iguanas underwater is Cabo Douglas, located at the northeastern corner of Fernandina Island on the western side of Isabela. The Humboldt current is the predominant current in this area, bringing in nutrient-rich, but very cold water from the west. Temperatures frequently dip to a chilly 13°C (56°F). The Iguanas at this location often let divers approach very close, seemingly unconcerned by their presence, because they are concentrating on finding rocks covered with tasty algae.

Like all iguanas, they take on



Diver gets a close look at a large male marine iguana at Cabo Douglas, Galápagos (above). PREVIOUS PAGE: A marine iguana uses its formidable claws to cling to the rocks as it feeds on algae, Cabo Douglas, Fernandina Island





## Iguanas

Marine iguanas conserve body heat (left) by lying on top of one another. These reddish iguanas are only found on the Espanola (Hood) Island in the southeast end of the archipelago; A marine iguana and a Galápagos penguin (far left) share a ledge to soak up the sun's rays after diving for food at Punta Vicente Roca, on the east coast of Isabela Island

the temperature of their surroundings. In the chill of the early morning hours of the day, they can hardly move until the heat of the sun speeds up their metabolism. Galápagos marine iguanas are active during the day. In order to raise their body temperatures as much as possible, they will spend the first few hours after sunrise preparing for their dip in the ocean. The mostly darker colors of the iguanas allow them to rapidly absorb heat. In the morning hours; they can be seen sunning themselves on the shoreline or piled together to share heat.

The vast majority of individuals in each colony will wait until low tide and then feed almost exclusively on marine algae on exposed rocks in the intertidal zones. The largest males, making up only five percent of the population, have a bolder feeding strategy and will actually dive deeper into the water for food, and mostly during the hot midday

hours. They will usually enter the water just before noon after they have had the opportunity to raise their body heat and will stay in the water to feed for up to two hours.

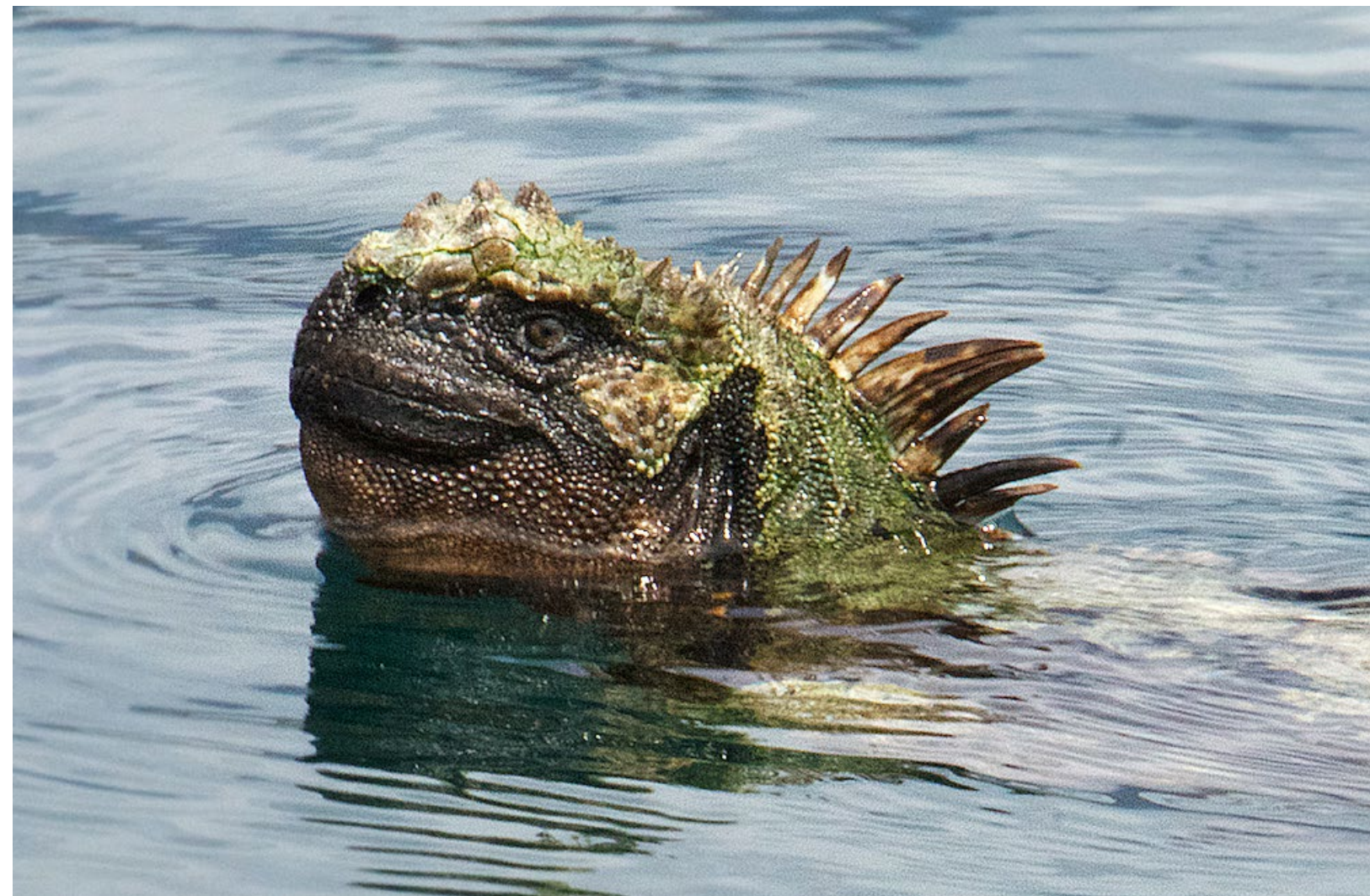
### Diving

The best time to dive with marine iguanas is from 11:00 am to 1:00 pm when most animals can be found in the shallows. You can often expect to encounter many iguanas in the protected cove just to the east of the point at Cabo Douglas, on Fernandina Island, on the western side of Isabela. The waters in this area are extremely cold, fed mostly by the Cromwell Current, which brings nutrient-rich water from the deep ocean to the west. These chilly currents cause the iguanas to lose heat rapidly when feeding. This forces them to return to the rocks and warm up in the sun again after feeding.

### Traits and behavior

The physical structure of these animals assists foraging. According to Shepard and Hawkes, the marine iguanas have "long claws, tough skin, blunt heads, flattened tails, and well-developed salt glands." <sup>1</sup> They have a laterally flattened tail and spiky dorsal fins, which aid in propulsion in the water and make them strong swimmers. The flat snout and sharp teeth enable them to graze on algae growing on rocks.

An iguana's size and the way it retains or loses heat determines its method of feeding. Small individuals, which lose heat quickly, forage on rocks at low tide, scraping algae off the surface of the rocks, and they rarely dive into the sea. Larger individuals, however, do not lose as much heat and so they can be active for a longer period. They most often graze on algae in the shallow water at depths of two to five meters, but can dive up to



A marine iguana swims for shore after spending an hour foraging for algae in the chilly waters off of Cabo Douglas, Fernandina



A male marine iguana appears to flash a big smile before continuing to look for a patch of green algae. The salt encrusted crest on the top of its head is clearly visible, Cabo Douglas, Fernandina Island

This male marine iguana saunters down to the beach making his way to the water, on Gardner Island, Galápagos.



25m down to rocks where there is an abundance of green and red algae, and little if any competition from other iguanas.

Activity slows between noon and late evening. Around two pm, it appears as if someone has rung a signal bell, starting a stampede of iguanas back to the shoreline. Before sunset, the iguanas retreat into crevices or beneath boulders to spend the night.

### Planning your dive

Divers who are interested in close encounters with these fascinating animals should select dive yachts that include Cabo Douglas on their itineraries. Plan your dives so that you are in the water before noon. It is not unusual to encounter 10 or more iguanas on a single dive.

Be patient and approach the iguanas slowly to get a close-

er look. When these animals are feeding, they do not seem too concerned by the presence of divers. As they cling tenaciously to the rocks, they can frequently be seen turning their heads to one side or the other, allowing them to harvest the algae with their rows of teeth on the side of their mouths. Their long, sharp claws keep them anchored to the bottom, allowing them to hold tightly onto rocks, helping them stay in one place and feed even in rough seas.

They can hold their breath up to 15 minutes and remain in the cold water for long periods of time. Once back on



A marine iguana uses its tongue to clean morsels of algae stuck in its teeth (or possibly express a fond farewell to a group of tourists).



land, they can often be observed sneezing and expelling liquid from their nostrils. Marine iguanas take in toxic amounts of salt while feeding underwater. A nasal gland filters excess salt ingested while eating. This is expelled through the nostrils by snorting, often leaving white patches of salt on their face. They have adapted so well to the ocean that they have become the only sea-going lizards on the planet. ■

Download the e-book guide, *Dive Galápagos 2nd Edition*, for more information about marine iguanas and other fascinating creatures to be found in the Galapagos. You can find *Dive Galápagos* on iTunes, Google Play or Amazon, or

for direct links to download the book from iBooks, Google Play or Kindle. For more information, go to [RosenbergEbooks.com](http://RosenbergEbooks.com).

Steve Rosenberg is a widely-published, award-winning American underwater photographer and photo journalist based in Arizona who has authored over 20 destination guidebooks for international publishers including Lonely Planet, Cruising Guides and Aqua Quest Publications. He won more than 250 awards for his imagery in international competitions, including gold medals in the prestigious Hans Hass Photo Competition in Austria and the First World Underwater Photography Competition held in the Turks and Caicos Islands in 1997. He holds the coveted SSI

Platinum Pro 5000 certification, awarded to divers with 5,000 or more dives, and is founder of Dive Galápagos, which provides a complete guide to dive sites in the Galápagos Islands, as well as Rosenberg Ebooks, which produces interactive e-books for dive and travel guides.

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Text by Konstantinos Alexiou  
Photos by Andrey Bizyukin

**The change in the physical behavior of gases in elevated pressures and the hyperbaric environment itself expose the human body to various stressors. This article—which will be presented in two parts—discusses inert gas narcosis (ING) and how it affects the diver, the mechanism behind narcosis, and methods used in order to ameliorate the negative impact of narcosis upon divers.**

In a mixture of gases, Dalton's law of partial pressures explains the relation between the total pressure exerted and the partial pressures of the individual gases. As the absolute pressure increases, the partial pressures of nitrogen and oxygen—in a mixture of air—will also increase. As the partial pressure of nitrogen rises in the body, so does the amount of nitrogen in our blood and tissues. This is due to Henry's law, which states that at a constant temperature, the amount of gas dissolved in a given type and volume of liquid is directly proportional to the partial pressure of that gas in equilibrium with that liquid.

"The functions of the brain are activated, imagination is lively, thoughts have a peculiar charm and, in some persons, symptoms of intoxication are present." This is how Junod described in 1835 the effects of breathing compressed air in hyperbaric environment [8]. In 1878, Paul Bert, in his monumental "La Pression

Barométrique", noted narcotic properties of air when breathed at increased pressures [5]. It was not until 1935 that Behnke, Thomson and Motley explained the phenomenon and discovered that the narcotic potency of nitrogen is the

cause of the intoxicating effects in diving [2].

To avoid this problem, in deep diving, nitrogen is commonly substituted by helium. Behnke pioneered the use of non-nitrogen gas mixtures, by using

heliox (helium-oxygen) diving schedules during the rescue salvage operation of the USS Squalus in 1936 from a depth of 74 metres. However, helium allows the expression of High Pressure Nervous Syndrome (HPNS).

Another gas that has been extensively under research for use as an alternative breathing gas in diving was hydrogen. Arne Zetterström of the Swedish Royal Navy first introduced the use of hydrogen as a diving gas in 1943. Hydrogen



# Part One Inert Gas Narcosis

— *Effects of Nitrogen vs. Helium*







has been considered and used in very deep diving as it comes with some advantages over helium [6], [9]. However, its use includes some disadvantages that we will see later.

### Nitrogen vs. helium

**Nitrogen.** Behnke and his colleagues noted that air at high barometric pressures produces a narcotic effect on humans. This state of abnormal functioning usually first appeared at three atmospheres absolute pressure (20 msw) and consisted of altered behavior, delayed mental activity and impaired neuromuscular coordination.

Although nitrogen is chemically inert, its physical properties make it analogous to narcotic substances. The principal reason is its high solubility in lipoid matter [2]. The onset of symptoms of nitrogen narcosis varies from diver to diver. Mild signs and symptoms can appear at 30m, but some individuals might be susceptible at shallower depths.

It has been shown by psychometric tests that there is a wide individual

variability and dive-to-dive or day-to-day variability. This is due to different individual physiological susceptibility, and to some other predisposing factors, such as fatigue, cold, increased partial pressures of carbon dioxide because of hard physical work, alcohol use or "hangover" conditions, work of breathing, anxiety and apprehension, as well as a rapid compression rate [4].

Behnke et al. stated that nitrogen narcosis is not sufficient to be a problem at 30m, but the situation tends to be worse at deeper depths. Symptoms tend to develop in a subtle way, but with harmful effects, if ignored by the divers.

Initially, there is lightheadness, euphoria, impaired judgement, and a false sense of security or overconfidence. If the descent is not halted, the diver may suffer from impaired concentration and memory, peripheral numbness, or hallucinations.

The final stage of nitrogen narcosis (ca. 100 msw) is more severe, including lethargy, drowsiness, and ulti-

mately loss of consciousness. At these depths, however, when breathing air, the toxicity caused by the high partial pressure of oxygen would likely cause injuries to the diver.

Everybody is affected at some depth, but there is the tendency to deny its occurrence—similar to alcohol and driving. There is no doubt that each diver copes, or learns to cope, differently with narcosis.

Highly trained and experienced divers, gradually accommodate the narcotic effects of narcosis. They learn to tolerate more effectively the different stressors during deep dives and recognize their own sign and symptoms.

As mentioned above, individual physiological variability, as in alcohol, plays an important role [2], [4]. Usually, ascent at shallow depth will resolve the effects of nitrogen narcosis, reducing the symptoms of intoxication. However, a recent study by Balestra et. al, showed that narcosis did not subside immediately after ascending to shallower depths, but its signs and



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symptoms remained even after the divers had surfaced [1].

**Helium.** According to their lipid solubility, three other gases are expected to be less narcotic than nitrogen: hydrogen, which is two to three times less narcotic than nitrogen; neon, which is at least three times less narcotic than nitrogen; helium, which is four to five times less narcotic than nitrogen (Table 1, right).

Theoretically, based on the lipid solubility, the narcotic effect of helium should occur at around 400m below water [3]. However, the high environmental pressure at this depth counteracts the weak narcotic potency of helium due to the pressure reversal effect.

Johnson and Flagler while experimenting on amphibians observed the “pressure reversal effect” in 1950. They anaesthetised tadpoles by ethanol (alcohol) and other drugs. The narcotized animals were later exposed to

very high hydrostatic pressure in a steel chamber. Pressures up to 68 ATA had no apparent effect on the spontaneous activity of the amphibians, but higher pressures (136 ATA) caused reappearance of spontaneous activity with the animals swimming in normal manner [7]. Therefore, the narcotic effect of the anaesthetic seemed to be abolished by an increase in the hydrostatic pressure.

The symptoms that appear below 100m are different from those observed in nitrogen narcosis and they are called High Pressure Nervous Syndrome (HPNS). The occurrence of HPNS was first reported by Bennet during research in connection with nitrogen narcosis during submarine escape from British submarines. This condition includes behavioral symptoms and elec-

Gas	Molecular mass (g/mol)	Solubility lipid	Narcotic potency
He	4	0.015	0.2
Ne	20	0.019	0.3
H <sub>2</sub>	2	0.036	0.6
N <sub>2</sub>	28	0.067	1

Table 1. Lipid solubility of inert gases and their rank from the least narcotic to the most narcotic according to their lipid (fat) solubility (data extracted from Bennett, P.B., Mitchell, S.J. Nitrogen narcosis, oxygen narcosis and the high pressure nervous syndrome. In Vann, R.D., Mitchell P.J., Denoble P.J., Anthony, T.G., eds. Technical Diving Conference Proceedings. Durham, NC: Divers Alert Network. 2009.).



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trophysiological changes, such as tremors of the hands, myoclonia, increased reflexes, nausea and vomiting, dizziness, fatigue and somnolence (desire to sleep), and dyspnoea.

Studies have shown that the severity of HPNS is affected by some factors, e.g., the compression rate and the curves of compression, the partial pressure of inert gases or pressure per se. A fast compression rate initiates the signs and symptoms of HPNS at a depth of around 200m becoming increasingly more severe in deeper water. Similarly, to nitrogen narcosis, there seems to exist an individual susceptibility with all signs and symptoms of HPNS [4]. ■

*Learn more about inert gas narcosis in part two of this series by Konstantinos Alexiou in our next issue.*

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# On the Other Side Of the Ice

*Ice Diving Competition in Vladivostok*

Text and photos by Aleksei Kondratuk







Participants (above and previous page) in the World Open Diving Championship in "Under-Ice Direction Finding" in Vladivostok, Russia

**If your home reef is covered in ice, don't rush to hang your fins on the wall. Ice above your head will make your underwater photos more spectacular! As the cold season has started where I live (in the Russian Far East), more and more divers are coming to dive the East Sea. This year, the Second World Open Diving Championship in "Under-Ice Direction Finding" was held in Vladivostok by the National Dive League of Russia.**

As is now tradition, the championship took place in Novik Bay in February. The ice on the sea is the most stable during this month. Preparation for the competition was carried out over several weeks. It was necessary to take care of the accommodation of Russian and foreign competitors as well as to prepare a "field" for the competition. This year, the organizers decided to form ice lanes in the shape of an infinity symbol, marked with checkpoints, and to place entrances to the ice lanes in the center of each ring.

The depth of the reef was only seven meters. But there was a huge amount of the mud on the seabed, which could create problems with visibility for unwary divers. For safety, all divers descended

with a safety line, pony bottle and knife or rope cutter. There was a member of the team at the surface, who set the safety line, using it to communicate with the competitor. Another team member at the surface stood ready to dive, in case of an emergency. To participate in the competition, all divers were required to have an Ice Diver certification.

So how did this ice diving competition come about? The idea for the competition was borrowed from the military. Military divers have to pass standards in navigating underwater dives within specific time limits, in difficult conditions in the overhead environments, whether it is a wreck or cave. This kind of training has become popular among recreation divers, and thus, eventually it evolved

One of the checkpoints in the ice diving race course where a support member of one of the several dive teams participating in the event will wait for his diver to emerge







Ice diving competition is extreme: not only is there no chance to abort the dive and return to the surface, but one must keep a cool head while navigating in an overhead environment

into the world championship competition. There were 28 divers from 12 teams who responded to invitations from the organizers this year. Besides the Russian divers, divers from Italy and South Korea also participated. All competitors had to navigate the same length race course under the ice, but with different checkpoints.

**The race**

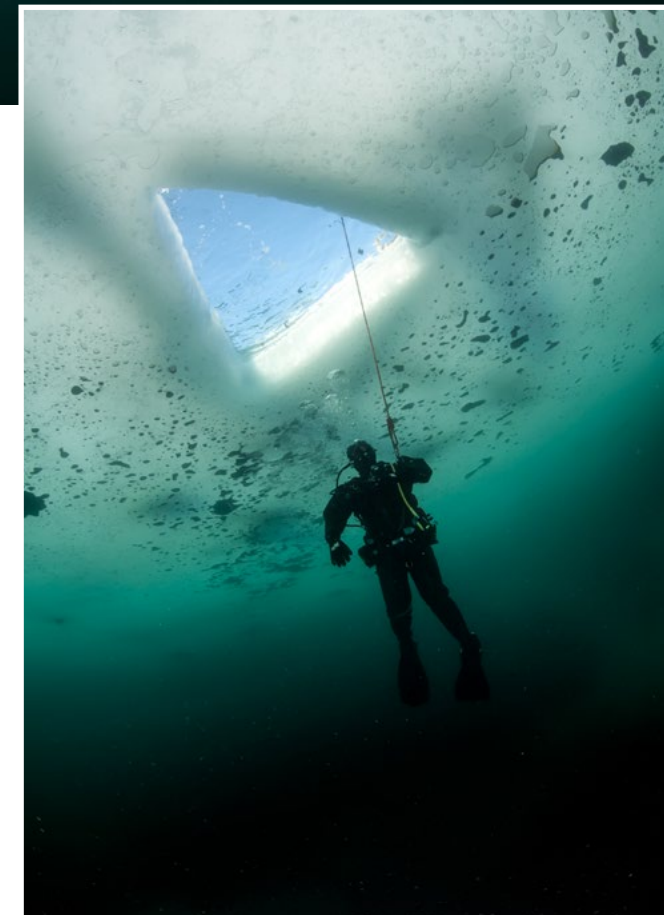
After pulling on a barely visible signal buoy on a rope in a hole in the ice, the diver must return to the start position where a judge checked the time (duration) of the dive. All participants had to perform a predetermined course (track) under the ice, using directions they received on a card prior to the dive. The main goal in the competition was not only to complete the predetermined course under the ice

as quickly as possible, but also to do it right.

The competition was divided into two days. On the first day, there was the general classification of all the competitors. The final race was held on the second day. Three prize winners were selected for each of three categories, which included men's individual, women's individual, and the team competition.

**Diving conditions**

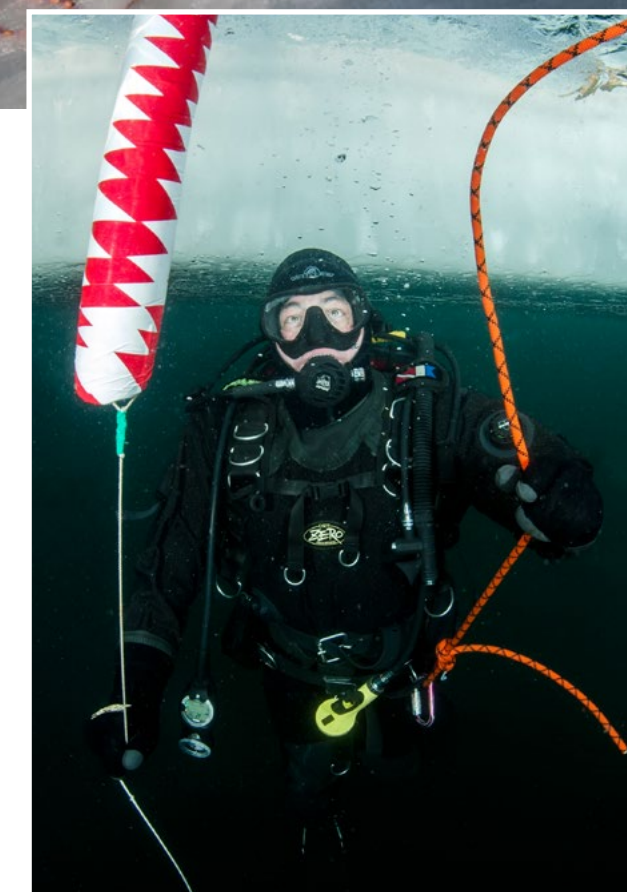
As for the diving conditions, this year's first day was sunny, with temperatures at about 0°C . The water temperature was -1°C. Visibility was around eight meters. But on the second day, weather brought a surprise for participants. Air temperatures dropped to -11°C, and the sky was overcast, with heavy cloud cover. As a



Diver on safety rope at entrance to the ice lane

To ensure safety of all participants in the race, all divers descended with a safety line, while a member of the team at the surface, who set the safety line, used it to communicate with the diver and another team member stood ready to dive, in case of an emergency.





Support members of one team in the competition help their diver get ready to enter the water (right) and start his course in the race (above), which is outlined on a map (lower right); A safety sausage, or surface marker buoy, is deployed by the diver at a checkpoint (left)

result, visibility underwater was reduced by half.

### Physical and mental challenges

Navigation under ice requires quite serious preparation. Ice diving involves diving in an overhead environment. You have one point of entry into the water, and one exit point, and they are usually in the same spot. In case of an emergency, the diver has no chance of aborting the dive and returning to the surface at any point, so mental prepara-

tion is very important.

Fear is common to all of us—it is a kind of defensive mechanism in any person who “enters a dark room.” But in this case, the situation was specifically created for the competition, so one has to condition one’s mind to take it for granted.

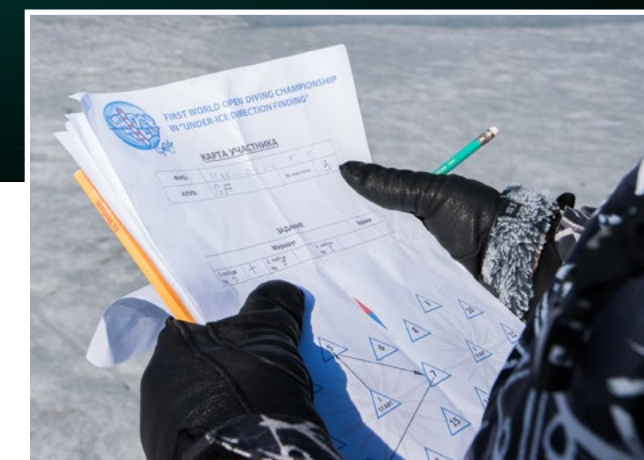
### Training and equipment

After you overcome your fears and want to go ice diving, it is very important to pay attention to technical training. The equipment must operate without failure! It is critical to use

only cold water regulators. One must not forget to reduce pressure in the main regulator and the spare regulator for the pony bottle, in order to avoid free-flow in ice conditions. Also, you need to check the valves of your drysuit and BCD before the dive. It is important to choose the right drysuit undergarment, helmet and gloves, because you will have to be in water at negative temperatures for quite a while.

Physical training in preparation for ice diving should be

at a high level too, because dives in such an environment requires not only courage, but also good physical shape. Each year more and more men and women with high skill levels are taking part in the competition.



Competitor's card with race course, checkpoints and time table





## Ice Diving

Diver reaches to pull a check-point buoy (far left); Safety sausage deployed by a diver at a check point (left); After pulling on a barely visible signal buoy on a rope in a hole in the ice (below), the diver must return to the start position where a judge checks the time (duration) of the dive.

has allowed me to capture interesting moments during the competition. In one of the dives, I followed one of the competitors like a shadow. When she came to the checkpoint and reached out to pull the marker buoy in the ice lane, the hand of a reporter with an action camera appeared in the frame of my viewfinder. This photo made my day!

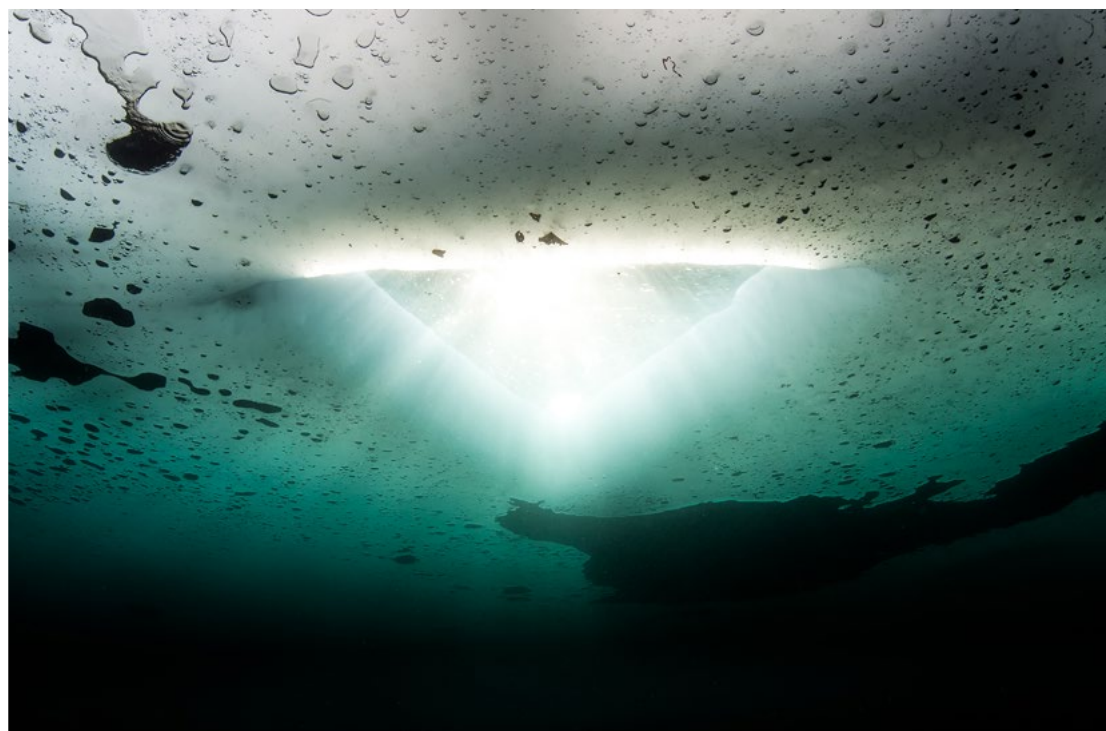
My bottom time at each dive was more than an hour. During this time, I saw about eight participants. Both beginners and

### Photography under ice

I took part in the competition as a land and underwater photographer, and also served as the safety diver under the ice. Underwater photo reportage is good practice for the photographer. You have no time to think about camera settings—you have to “catch the moment.”

The day before the competition, I drew small sketches to imagine what I would like to see in my camera viewfinder. In one of my sketches, I pictured a diver with sun rays in the background bursting into the ice lane. Then, on the day of competition, when one of participants entered the ice lane and began to run his course, I experienced a moment of “deja vu”—it was my “sketch”!

The role of “underwater reporter”



Sun rays streaming through the ice and water allow dramatic images to be captured







Captured! The moment the hand of a reporter holding an action camera, dipped into the freezing water at a checkpoint to photograph an approaching diver, appeared in the frame of my viewfinder (left)

winners from previous competitions took part in this year's event, as evidenced in the varying skill levels of the participants.

### Range of skill levels

The experience level of each competitor was visible right away. After the start of the race, the divers immediately began to move in one direction at an average depth, correcting their course along the way. Upon approaching a checkpoint, divers scrolled their compass reels to the next predetermined angle or direction, and began to move to the next checkpoint, without reducing speed.

Errors made by the beginners were all the same. After entering the water, they immediately started to look for the direction in which to swim, but in the meantime, they were falling to the bottom. Then they began to move, lifting sediment from the bottom. With the mud rising from the bottom, visibility was reduced, down to one to two meters. In these conditions, it was very difficult for them to see the buoy rope in the ice lane, and they had to spend more time on the race course. A lot of divers used frog-style kicks underwater, which were not very fast. It was better to use a simple style of finning in order to gain more time.

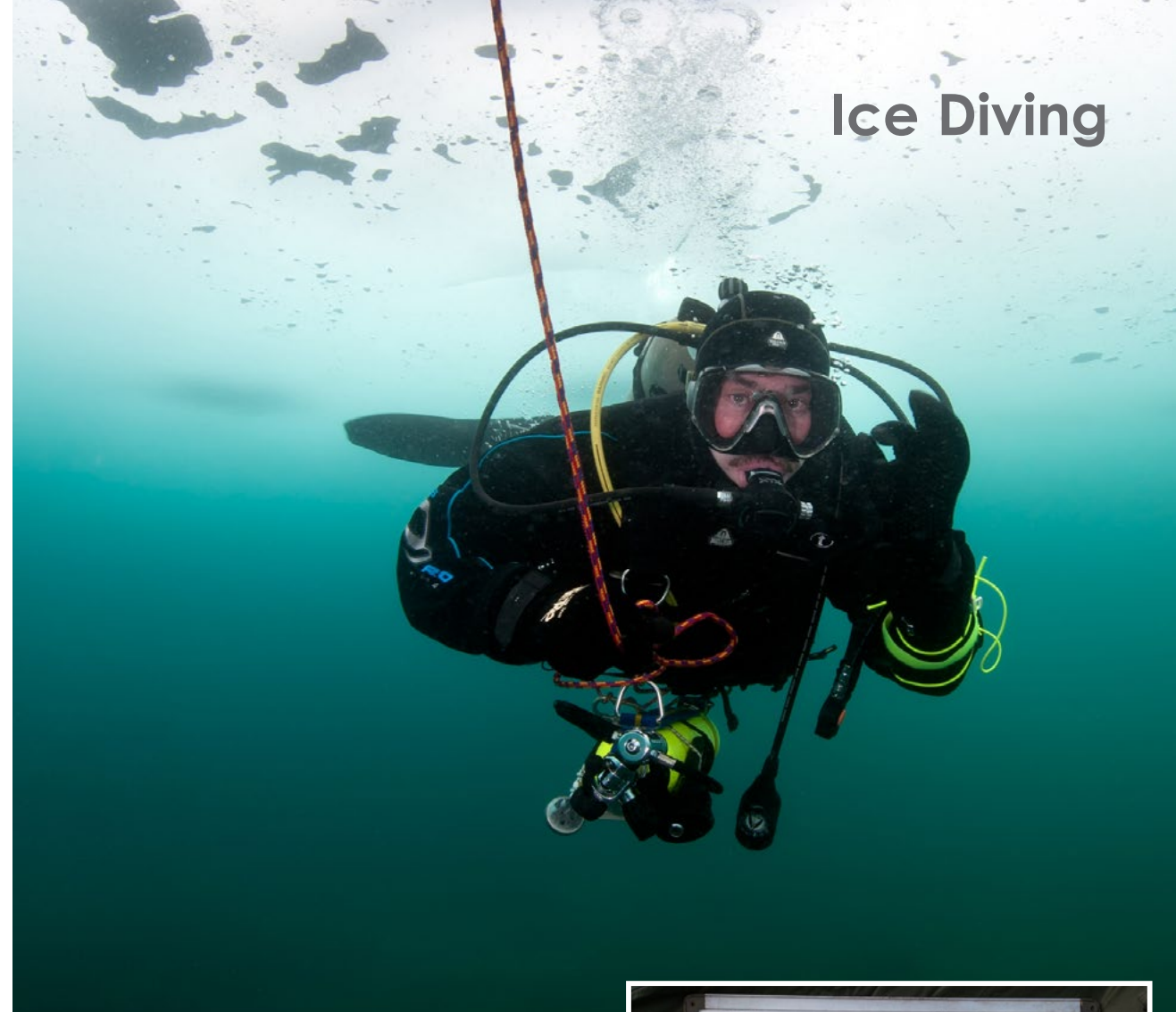
### Results

Different skills and styles led to various time results: the fastest time on the ice diving course was 3 minutes 28 seconds for men and 3 min-



THIS PAGE: Prizes were given to three winners in three categories—the men's individual, the women's individual, and the team competition

## Ice Diving



utes 35 seconds for women; and the slowest was 11 minutes 32 seconds, and 13 minutes and 21 seconds, respectively.

Finalists were chosen at the end of the first day. The winners in the individual competitions were selected on the second day. Prizes were also awarded to the winning teams formed by the participants. The award ceremony was held on the same day. Winners received prizes from the sponsors of the competition.

So what is the main purpose of these ice diving competitions? First of all, it unites divers and brings together people with similar interests. It allows people to experience the spirit of extreme diving events in a safe environment. It challenges one to defeat one's fears, to become a better and stronger diver, because participation in such a competition is an excellent opportunity to improve one's skills in ice diving and navigating under ice. ■

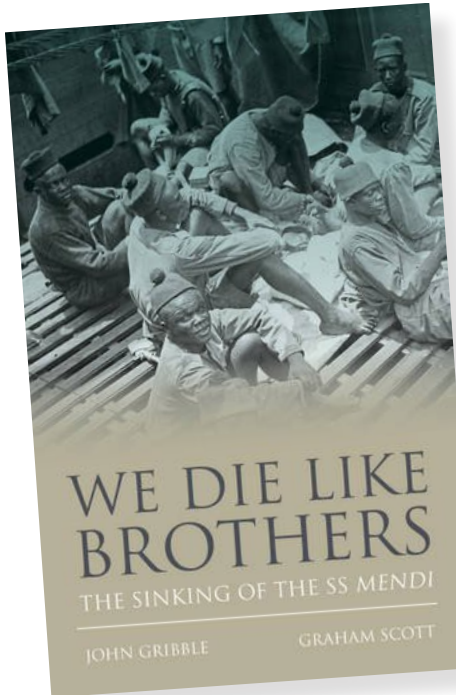
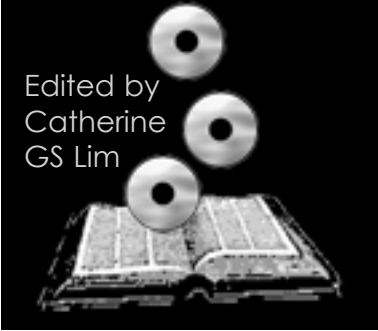
To book your team for next year's competition, go to: [Icedive.me](http://Icedive.me). For more information, visit [Aleksei Kondratuk's website](http://Aleksei Kondratuk's website) at: [UWvision.com](http://UWvision.com).

Турнирная Таблица					
№	ФИО	Клуб	Итоговый	Время	
1	Терновой А.	ТУРСИО	+	+	3:28.00
2	Ильенко М.	ТУРСИО	-	-	6:35.00
3	Маковский К.	SEA FROGS	+	+	3:41.00
4	Корниенко С.	Sea Frogs	+	+	6:28.00
5	Андреев А.	ДВФУ	-	-	4:41.00
6	Рюо Нyeong-beun	SUA	+	+	3:40.00
7	Соколов О.А.	Frog man	+	+	3:10.00
8	Иванова И.	ДОСАФ	+	+	5:45.00
9	Рябинин И.	ДОСАФ	+	+	4:39.00
10	Медведева Ю.	Sea Girls	+	+	4:43.00
11	Панина И.	Sea Girls	+	+	7:05.00
12	Крутиченко	ROYAL FISH	+	+	6:40.00
13	Корниенко О.	Sea Girls	+	+	13:21.00
14	Кабанов Р.	ВЫМПЕЛ	+	+	4:51.00
15	Тесленко С.	ДВФУ	-	-	5:16.00
16	CHONGJ S.H.	SUA	+	+	4:45.00
17	Леднев Р.	Sea Frogs	+	+	4:35.00
18	Ромашов Е.	ВЛАДСКУБА	-	-	7:40.00
19	Калешев А.	ВЫМПЕЛ	+	+	4:12.00
20	Гордеев А.	ФРОГ МАН	+	+	3:40.00
21	Гурьев Д.	ДВФУ	+	+	5:30.00
22	Гудков К.	ФРОГ МАН	+	+	4:24.00
23	Мешков Д.	ТУРСИО	+	+	11:32.00
24	Панзо К.	ИМТИФЕРМ			
25	Иванов П.	ДОСАФ	+	+	5:11.00
26	Тагель И.	ВЫМПЕЛ	+	+	4:51.00
27	Ng SOON OK	SUA	+	+	4:49.00
28	AN MIN SUN	SUA	+	+	3:35.00





Edited by  
Catherine  
GS Lim



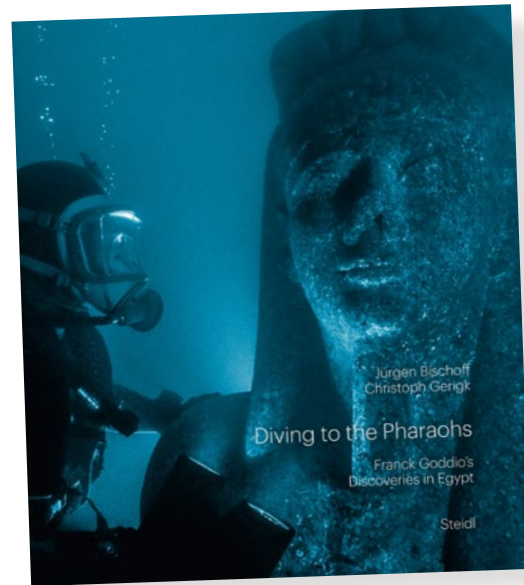
## SS Mendi

*We Die Like Brothers: The Sinking of the SS Mendi*, by John Gribble and Graham Scott.

When the SS *Mendi* sank after a collision in a fog in February 1917, nearly 650 men lost their lives. They were on their way to serve as

labourers on the Western Front. Over the years, the wreck became a symbol of black South Africa's fight for social and political justice and equality. Now, for the first time, new archaeological investigations have yielded new information about the wreck. This book updates the political, social and cultural repercussions about the SS *Mendi's* sinking with an archaeological perspective.

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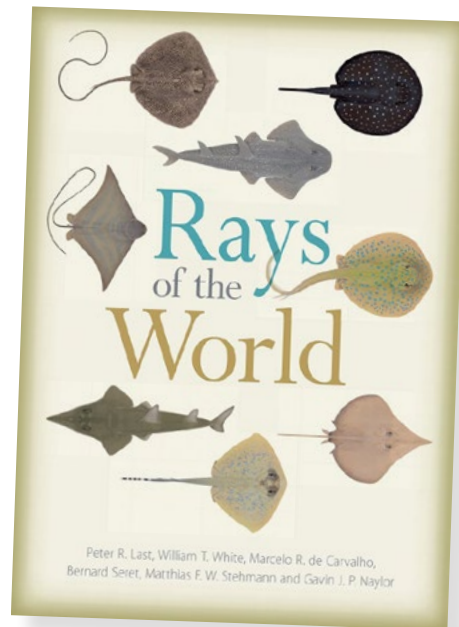
## Ancient Finds

*Diving to the Pharaohs: The Discovery of Sunken Egypt*, by Christoph Gerigk and Jürgen Bischoff.

This book describes underwater archaeologist Franck Goddio's quest to locate the Egyptian city of Alexandria. Using cutting-edge sonar and nuclear magnetic resonance technology, he discovered cities (complete with temples and colossal statues) that had been swallowed by the sea, as well as the world's largest ancient ship cemetery. Besides delving into what life must have been

like in the cities when they were thriving, the book also gives us a glimpse of life on board a research ship and follows divers on their underwater quests.

Hardcover: 194 pages  
Publisher: Steidl  
Date: 28 February 2017  
ISBN-10: 3958291791  
ISBN-13: 978-3958291799

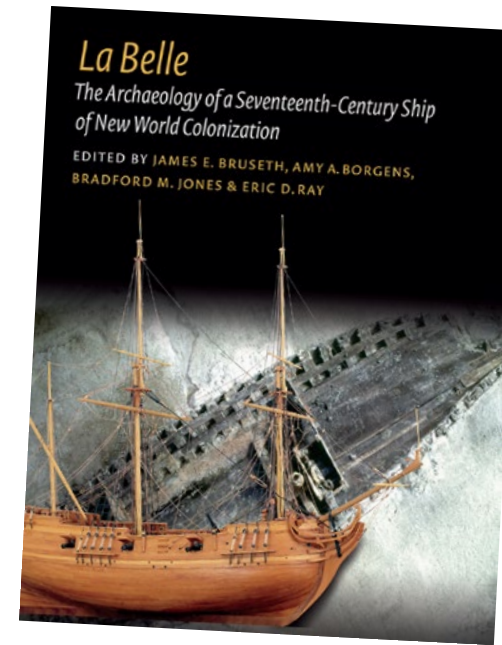


## Rays

*Rays of the World*, edited by Gavin J. P. Naylor, et al.

Stingrays, manta rays, eagle rays... Unless one is a scientist or a diver with a keen interest in rays, one might be able to name perhaps five or so species at most. This does little justice to rays, which comprise 26 families and 633 valid named species. This book is thus a step in the right direction as it attempts to document all the rays found worldwide and promote wider public interest in them. As the first pictorial atlas of the world's rays, it contains paintings of all the living species by Australian natural history artist Lindsay Marshall, and has been compiled as part of the Chondrichthyan Tree of Life Project.

Hardcover: 832 pages  
Publisher: Comstock Publishing Associates  
Date: 15 December 2016  
ISBN-10: 1501705326  
ISBN-13: 978-1501705328

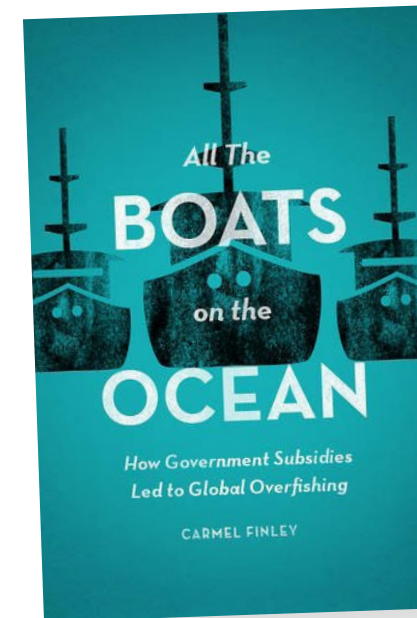


## La Belle Shipwreck

*La Belle: The Archaeology of a Seventeenth-Century Ship of New World Colonization*, edited by James E. Bruseth, et al.

In 1686, French explorer Robert de La Salle sought to establish a colony at the mouth of the Mississippi River, but the expedition led him to Matagorda Bay in Texas, where his ship *La Belle* ran aground during a storm. After the wreck of *La Belle* was found in 1995, an extensive archaeological excavation was undertaken, necessitating the construction of a steel cofferdam. In all, more than 1.8 million artefacts were recovered from the wreck. This book relates this massive operation, documenting one of the most significant North American archaeological discoveries of the twentieth century.

Series: Ed Rachal Foundation Nautical Archaeology Series  
Hardcover: 916 pages  
Publisher: Texas A&M University Press  
Date: 3 March 2017  
ISBN-10: 1623493617  
ISBN-13: 978-1623493615



## Where are the fish?

*All the Boats on the Ocean: How Government Subsidies Led to Global Overfishing*, by Carmel Finley.

Author Carmel Finley examines how government subsidies, trade policies and tariffs have transformed fishing from a humble coastal activity into a global profit-making industry. It has been used by nation states to make distinct territorial claims and sometimes, it has even caused depletion of fish stocks in some areas. This book also looks at how the expansion of fisheries have led to the development of fisheries science and the creation of international fisheries management, and how, in today's world of high demand, the survival and future of our ocean's fishes are in no way guaranteed.

Hardcover: 224 pages  
Publisher: University Of Chicago Press  
Date: 27 February 2017  
ISBN-10: 022644337X  
ISBN-13: 978-0226443379



# marine mammals



GE STANTS / WIKIMEDIA COMMONS / PUBLIC DOMAIN

Rorqual whales, such as humpback whales, expand their ventral grooved blubber to capture prey during feeding

## Whales have stretchy nerves, which fold neatly

**Researchers at the University of British Columbia (UBC) have found a unique nerve structure in rorqual whales' mouths and tongues, which can double in length and then recoil, in an action that is similar to a bungee cord. This flexibility of the nerves explains how large whales are able to take a big gulp, ballooning a hug pocket between the body wall and a layer of blubber, to catch their prey as they feed.**

Wayne Vogl of the Cellular and Physiological Sciences department at UBC said: "This discovery was totally unexpected and

unlike other nerve structures we've seen in vertebrates, which are of a more fixed length." He added, "The rorquals' bulk feeding mechanism required major changes in anatomy of the tongue and mouth blubber to allow large deformation, and now we recognize that it also required major modifications in the nerves in these tissues so they could also withstand the deformation."

According to scientists, the whales' nerve cells are not damaged when stretched, as they are simply kept folded in a central core. This means that the individual nerve fibers never really get stretched, just unfolded.

"Our next step is to get a better understanding of how the nerve core is folded to allow its rapid unpacking and re-packing during the feeding process," said Robert Shadwick, a zoologist at UBC.

Reported in *Current Biology*, the findings of the study of specimens obtained at a commercial whaling station in Iceland, raise questions about similar characteristics in other animals, like the ballooning throats of frogs, for instance, or chameleons' long and quick tongues.

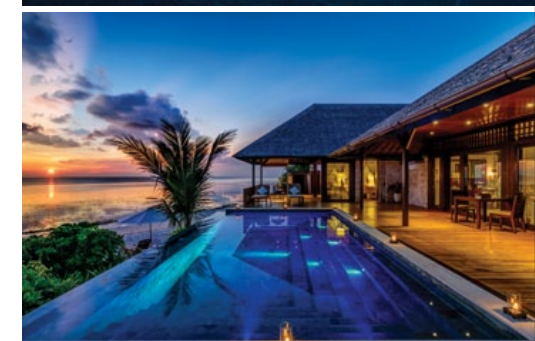
"This discovery underscores how little we know about even the basic anatomy of the largest animals alive in the oceans today," said Nick Pyenson, a postdoctoral fellow at UBC and the current curator of fossil marine mammals at the Smithsonian's National Museum of Natural History. "Our findings add to the growing list of evolutionary solutions that whales evolved in response to new challenges faced in marine environments over millions of years." ■

SOURCE: SCIENCE DAILY, UNIVERSITY OF BRITISH COLUMBIA



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*In the absence of manta ray tourism, between US\$16,1 and 27.7 million would be lost to the region each year.*



## Benefits of manta ray tourism

**Manta rays are an internationally threatened species and population declines have been reported in various locations worldwide. As iconic megafauna species, they are also major drawcards for wildlife tourism industries. Eco-tourism is proving to be an excellent way of generating a positive, sustainable balance between protecting populations of animals and creating an economically viable alternative to fishing.**

As an internationally threatened species, the health of many manta ray populations are now being examined and the sustainability of emerging fisheries questioned. Aside from fishing pressures, manta rays also face entanglement in discarded nets, pollution and habitat destruction.

A recently released scientific study by the Marine Megafauna Foundation (MMF), a non-profit marine research and conservation organization, has highlighted the benefits of manta ray tourism in Mozambique. The organization was founded in 2009 to research, protect and conserve the large populations of marine megafauna found along the Mozambican coastline, which stretches for 2,470km and now has six designated Marine Protected Areas.

### Worth millions

MMF's study represents the first localized estimate of the economic benefits of manta ray tourism in Mozambique. Data from 478 tourist expenditure surveys, 15 stakeholder surveys, and yearly diver numbers provided by coastal tour operators were used to estimate the economic impact of manta ray tourism in the Inhambane Province. Manta ray-focused tours were estimated to be worth US\$10.9 million per year in direct revenue to dive operators in the Inhambane Province, with an estimated direct economic impact (including associated tourism expenditures) of US\$34 million annually.

In 2012, MMF joined forces with other researchers across the world to produce the Manta Ray of Hope Report, which estimated

global manta ray tourism at over 50 million dollars annually. These figures are astonishing when compared to the US\$250-500 that a dead manta can yield in the fish markets across the world.

"The opportunity to interact with manta rays in their natural environment attracts tourists from all the world to Mozambique, directly benefiting the local economy. This study demonstrates that in the long term conserving these gently giants outweighs the one-time economic benefits of fishing them," said Stephanie Venables, a scientist at the MMF.

### Mitigating tourism

Understanding the complex nature of human-induced impacts, MMF scientists are equally concerned about the negative influence of tourism on the be-

havior and general health of local populations. To that end, MMF is also working towards reducing impacts on rays through the production of educational material, the development of a manta ray code of conduct, and the overall encouragement of sustainable diving practices in both the Inhambane Province in Mozambique and in Manabí Province in Ecuador.

Globally, manta researcher Dr Andrea Marshall has co-developed the first manta ray awareness specialty for PADI, a course that aims to both increase awareness about the species and train divers as "citizen scientists" taking and uploading ID images across the world for use in global research projects. ■ SOURCES: MMF PRESS RELEASES, MMF WEBSITE, TOURISM IN MARINE ENVIRONMENTS



Mantas are found in temperate, subtropical and tropical waters. Both species, *Manta birostris* and *Manta alfredi*, are pelagic.





# Shark compounds could help treat Parkinson's and Alzheimers

**Squalamine, a chemical compound found in dogfish sharks, has the potential to reduce the formation of toxic proteins related to the development of Parkinson's disease. Meanwhile, Danish drugmaker Lundbeck is betting that shark antibodies may offer a new way of getting drugs into the brain to fight Alzheimer's and other diseases.**

Parkinson's disease is a progressive condition characterized by tremors, movement problems, limb stiffness, and problems with balance and coordination. In people with Parkinson's, a protein called  $\alpha$ -synuclein and whose function in the healthy brain is currently unknown, can clump together to form toxic plaques that can cause brain cell death. Researchers are on the hunt for compounds that can block the formation of these clumps, known as *Lewy Bodies*, which could help to treat or prevent the disease.

## Squalamine

A compound called squalamine derived from tissues of the dogfish

shark might be a potential candidate. The compound—a potent antiviral and antibiotic compound that could protect liver and blood tissues from viral infections—has been known since the 1990s when US researchers discovered its role in the dogfish shark's hardy immune system. A new study conducted at Georgetown University found that squalamine also prevented  $\alpha$ -synuclein aggregates from binding to the outer membrane of human neuronal cells, where the aggregates usually form, thus preventing the protein's toxicity.

"To our surprise, we found evidence that squalamine not only

slows down the formation of the toxins associated with Parkinson's Disease, but also makes them less toxic altogether," said Christopher Dobson, a co-author and professor of chemistry at the University of Cambridge.

## Getting drugs to the brain

The blood-brain barrier helps block harmful substances, such as toxins and bacteria from entering the brain, while letting in hormones and key nutrients, including glucose and several amino acids. In contrast, larger molecules, such as glucose or insulin, must be ferried across by proteins. These transporter proteins, located in the brain's blood

vessel walls, selectively snag and pull the desired molecules from the blood into the brain. Getting modern large-molecule medicines across that barrier is a major challenge for drug developers. An estimated 98 percent of potential drug treatments for brain disorders are unable to penetrate the blood-brain barrier. Sharks, as the most evolutionarily ancient animal species to have an immune system similar to humans, may offer a solution.

## Antibodies as trojan horses

Shark antibodies, thanks to their small size and high solubility, it turns out, can help therapeutics cross the blood brain barrier. A

The spiny dogfish, spurdog, mud shark, or piked dogfish (*Squalus acanthias*) is one of the best known species of the Squalidae (dogfish) family of sharks.



ANDY MURCH

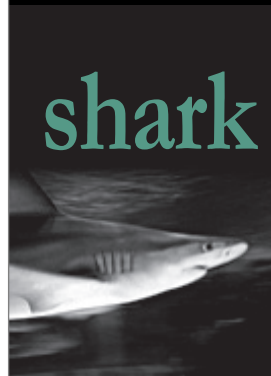
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SOURCE: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES





AMANDA COTTON

# Sharks keep setting distance records

A male mako shark named Hell's Bay has broken a record, traveling more than 21,000km (13,000 miles), equal to over halfway around the planet, in 600 days. It is the longest track ever in the Atlantic Ocean by a mako shark tagged by researchers in Nova Southeastern University's (NSU) Guy Harvey Research Institute (GHRI).

Meanwhile, scientists from Mote Marine Laboratory in collaboration with scientists from the University of Havana have published the first-ever peer-reviewed scientific paper on the movements and habitat use of the longfin mako, a rare and vulnerable species of shark.

The study is based on two longfin makos tagged with satellite-linked tracking devices, one in 2012 and the other in 2015. The sharks' movements shed light on the life of a rare species while demonstrating an important point: The U.S., Cuba, Mexico and

the Bahamas are fundamentally connected by the sea. Although rare, longfin makos are widely distributed in temperate and tropical waters around the world. This species generally inhabits deeper waters and is less well-known than its shallower-water cousin, the shortfin mako. Because of this lack of data and this shark's low reproductive output, plus its vulnerability to commercial longline fisheries, the longfin mako is a species of special conservation concern.

## First tagged mako

The first shark was tagged in the northeastern Gulf of Mexico. The data showed the shark had stayed just off the continental shelf in the eastern Gulf of Mexico, moving in a southeasterly direction for the first three weeks. It then entered the Straits of Florida and continued on an easterly path between Cuba and the Florida Keys, passing into the waters of the Bahamas to the west of Grand Bahama Island. The shark then moved into the open Atlan-

tic Ocean in early June, ending up off the Chesapeake Bay in July, when the tag popped off the shark and came to the surface. The total track covered nearly 6,810km (4,231 miles) in three months, averaging about 74km (46 miles) per day.

## The other

The second shark was tagged almost three years later off northern Cuba. It traveled with the Gulf Stream current between Florida and the Bahamas, and then doubled back into the eastern Gulf of Mexico, where it swam in a clockwise loop in April and early May between Florida and Mexico's Yucatan Peninsula. Then in May the shark swam back along the Gulf Stream, through the northern Bahamas and into deep waters of the open Atlantic, where it proceeded north until it was offshore of New Jersey in late June. Finally, it headed south to waters off Virginia, and its tag popped off and surfaced about 200km (125 miles) east of the mouth of the

Chesapeake Bay. The total track covered nearly 8,850km (5,500 miles) in five months, averaging about 59km (36.5 miles) per day. The tag also showed the second mako made some extreme dives including one to 1,767m (5,797 ft), more than a mile deep. However, it spent a majority of its time in depths of less than 500m (1,640 ft), staying mostly deeper during the day than at night.

## Basking sharks wander too

It was once thought that Britain's basking sharks hibernated in the waters off the United Kingdom and Ireland, but evidence in recent years has undermined this theory. Scientists from the University of Exeter (UK) have discovered some of them spend their winters off Portugal and North Africa, some head to the Bay of Biscay and others choose a staycation around the United Kingdom and Ireland. ■

SOURCES: GUY HARVEY RESEARCH INSTITUTE, MOTE MARINE LABORATORY, SCIENTIFIC REPORTS

# New species of hammerhead shark found?

Researchers have stumbled upon what they believe to be a new species of hammerhead shark. The DNA sequencing of what were thought to be bonnethead sharks in Belize, showed differences between them and other bonnetheads in the area. The finding may have a major impact on conservation protocols for hammerhead sharks, as there may actually be two species, with smaller overall numbers and distributional ranges.

Hitherto, bonnetheads, a small species of hammerhead shark, were considered abundant and widely distributed in the United States, Bahamas, Caribbean and Latin America. With the possible new species, the vulnerability of each species to extinction must be reassessed, said scientists.



D ROSS ROBERTSON / SMITHSONIAN / PUBLIC DOMAIN

"Now we have to define the range of each of these species individually and assess them independently against where the potential threats are," said Demian Chapman of Florida International University, lead researcher of the team that made the discovery, which included scientists from Stony Brook University, Florida International University, University of North Florida and the Field Museum of Chicago. "For example, there are published reports that bonnetheads have nearly been wiped out by unregulated fishing in Brazil. We do not know which species this is and our finding of a new species in Belize highlights that there could be more undescribed ones out there, each one facing a unique set of threats," he added. ■ SOURCE: FLORIDA INTERNATIONAL UNIVERSITY

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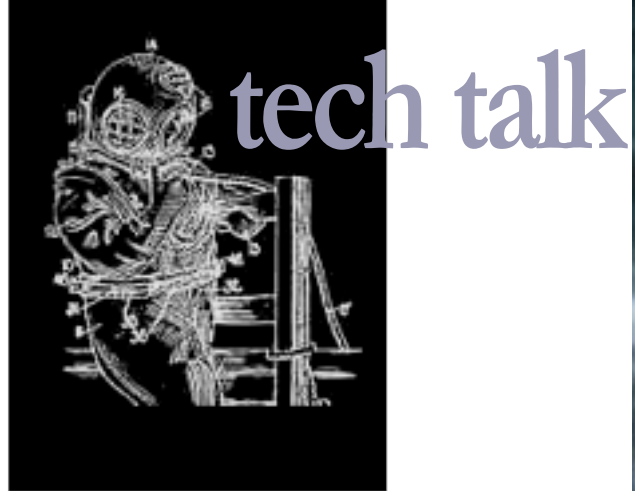
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Text by Matt Jevon  
Photos by Andrey Bizyukin

I read a blog recently that suggested our egos could be responsible for many of the casualties that technical diving regrettably suffers. Sadly my comments on this blog never made it past the moderator. As a scientist and psychologist, I am somewhat protective of terminology used to describe human thought, emotion and behaviour, and the author of this blog fell into a common trap in how one described ego.

Ego simply refers to self and how we feel about ourselves. This results in our thoughts, emotions and behaviour. Where an ego is arrogant, overbearing, misguided or delusional, then bad things can and often do happen. However, having a big ego is not, without a skewed view as above, going to

cause any problems—in fact, quite the opposite. Let me explain.

Psychological research used to place ego and task focus on a continuum, generally to describe motivational style. Educational psychologists as late as the

last decade, which is when most diving education systems were thought up, “proved” that in educational settings a task focus was more beneficial. Learners were more motivated by task satisfaction and clarity than by internal or external

ego boosting rewards (money, status, etc). The flaw in much of this research is that learners were classified as being either task or ego focused, there was no delineation of people who were high in both task and ego focus, or in fact, low

in both and not at all motivated.

#### **Task and ego focus**

My own research and practice, backed by some very good recent research, shows that true high performers in any



# The Role of Ego

*In Technical (& Recreational) Diving*







field are highly motivated by both task and ego focus—not just to learn but to achieve, or to avoid failure and to maximise their potential. I am quite sure in work and in diving we can easily describe people we see as being highly motivated, and equally, people who cannot be motivated even by a good old fashioned kick in the ass!

Now, there's a kicker... Both task and ego focus can be internally directed or externally directed. External ego driven people like status, recognition and reward and will enjoy and revel in compliments, etc. Internal ego driven people often do not mind these things, but would not seek them out—their own judgement of self being far more important to the influence on their ego. Evidence used by both

internal and externally driven people would be wins vs losses, feedback or reflection on skills performed, dives achieved, etc.

The bigger the ego, internal or external the better; the higher the level of task focus, the better. Having both, awesome. So why did the original blog's author get it wrong? Because the writer confused ego with arrogance, ego with overconfidence, ego with a lack of honest appraisal on one's own skills and abilities.

### Ego vs. arrogance

I work a lot with elite and consistently high performing sports and business people. All have high levels of ego or task focus. About a third have a high need to achieve, to experience success. The rest, including me are

frightened to death of failing.

Why? Because we have big egos and lots of confidence, well placed as it happens in our ability. Failing would not only not provide the reward our egos need, it would damage our ego and confidence. So, we are detailed and meticulous in ensuring we will not fail. We work very hard, past the point where others would have given up, in order not to fail. This is hardly the approach of arrogant and overconfident divers at high risk of an incident.

So to the blog author's point, which was of massive value: what is it about our attitude as divers that makes us a danger unto ourselves? Simply put, it is a matter of perception versus reality. The at-risk divers perceive or believe they have the skills, training and experience



Photo: Brian Kakuk www.BahamasUnderground.com

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to do dives that are, in reality, beyond them. This is arrogance, not ego. This is overconfidence, not ego. This is pure self delusion, or worse, peer pressure.

### Self appraisal

How do we counter this? We get honest feedback or practice honest self appraisal. We seek out multiple sources of evidence to help with this: instructors, team mates, videos, benchmarks of dives achieved versus dive plans, and so on. We do not get deceived by people telling us we are better than we know we are.

Avoiding being distressed and getting into the panic spiral when failures and negative incidents are experienced on a dive relies on a

cool and confident head. A strong and big ego, coupled with great task focus, will be a huge asset and will be the most likely thing to keep you alive.

It has become a bit anti-social in some circles to be seen as being super confident, to be seen as having a big ego. I think you can be this way without being a jerk. But if not, well, maybe it is better to be a live jerk than being a dead nice guy, with delusions of one's abilities.

Dive safe. Dive confident. Dive honest. ■

*A native of the Republic of Ireland, Matt Jevon, MSc., is an experienced and passionate open*

*and closed circuit 100m trimix diver and full cave diver. Whether using backmount, sidemount or his favourite JJ-CCR rebreather, Jevon believes technical diving is all about being safe, having an awesome dive and enjoying experiences few people share. Jevon holds instructor qualifications from TDI, PADI TECREC and IANTD, and partly owns South West Tech—a TDI dive centre in Ireland. Jevon is also an approved JJ-CCR instructor and dealer. In addition, he is a sports psychologist, senior rugby coach and works in strategy and private equity. For more information, please visit: [Swt.ie](http://Swt.ie) and [Mattjevon.com](http://Mattjevon.com).*

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# tech talk

Diver on wreck of SS *Genoveva Fierro* off the Spanish coast at Laredo

Text and photos by Sabine Kerkau

Croatia, Italy, France—these European destinations have long been coveted insider knowledge for technical and wreck divers. But what about Spain? Technical diving is still in its infancy in Spain. Nevertheless, there are some dive centers in the Mediterranean, as well as on the Atlantic coast of Europe, which offer trimix. There are countless worthwhile destinations in Spain. Unknown wrecks may be found at depths between 60 and 120+m, but there are also many cave systems waiting to be explored and discovered. In this article, I take a closer look at the wrecks off the Atlantic coast of Spain, between Bilbao and Santander.

## Laredo

The Atlantic is unpredictable. If you want to do technical wreck diving off the coast of northern Spain, you must be flexible enough to deal with conditions that change very quickly. One should allow extra time for this, and it does not hurt

to also have an alternative program—a plan B—in case changing conditions scuttle your initial plans. Nevertheless, the forgotten wrecks of Laredo are definitely worth a visit.

Joseba Alberdi is the owner and operator of the Mundo Submarino dive center in the Spanish city of Laredo. He and his team, the Ocean Project organization, have rediscovered and identified

many historically important wrecks off the coast in recent years.

## SS *Genoveva Fierro*

Sunk on 16 December 1925, the

*Genoveva Fierro* was built in Scotland in the Grangemouth shipyards. It was launched in January 1894 and sailed its first years under the name *Macarena*. The *Genoveva Fierro* was a steamship



# Forgotten Wrecks of Laredo







Diver (above) and conger eel (right) on wreck of *Genoveva Fierro*

with a steel hull. It was 66.9m long and 10m wide.

In 1920, the ship was acquired by Federico Fierro and renamed SS *Genoveva Fierro*. On 15 December 1925, the ship was loaded with coal on the way to Bilbao. For some reason, the ship collided with SS *Antonio*. Although the crew of the *Genoveva Fierro* tried to get to Bilbao, their attempts failed, and the vessel sank about three miles north of Punta del Pescador. Fortunately, no one was killed in the ship's destruction. It was assumed that the place where the ship sank was about 45m deep.

For a long time, the wreck was forgotten until the Ocean Project organization began to search for it. In the beginning, the team had



only very inaccurate data available to them. So, they collected information and made many dives, but without success. From

the start, there was the possibility that the search could never succeed in finding shipwrecks, since some wrecks in the area were

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Laredo

THIS PAGE: Scenes from the wreck of SS *Genoveva Fierro* off Laredo; Diver with John Dory fish, or *Zeus faber* (right)

destroyed with the help of dynamite and had their metal removed in salvage operations. But Ocean Project's dive team members, Alberdi and Alberto Marin, were stubborn and did not give up. Finally, they had success! In May 2000, they found the remains of SS *Genoveva Fierro*, after nearly three years of searching.

The wreck lies on sand, at a depth of 55m. The bow points to the northeast. The wreck is broken into two parts. In the last 75 years, many storms have passed over this site, damaging the wreck. The bridge has disappeared. At the highest point of the wreck, the hull projects 8m above the seafloor. Strangely enough, coal is still found in the wreck's holds. Because of its cargo of coal, the wreck has long



been nicknamed "Carbonero," meaning "coal merchant."

Visibility on the wreck can vary a lot. It is strongly influenced by the tides. In addition, the wreck can be affected by sediment, as it is

located near the mouth of the river Santona. Nevertheless, it is a very beautiful wreck site where one can frequently see ocean sunfish (*Mola mola*) and John Dory fish (*Zeus faber*).







THIS PAGE: Divers on wreck of *Andra*

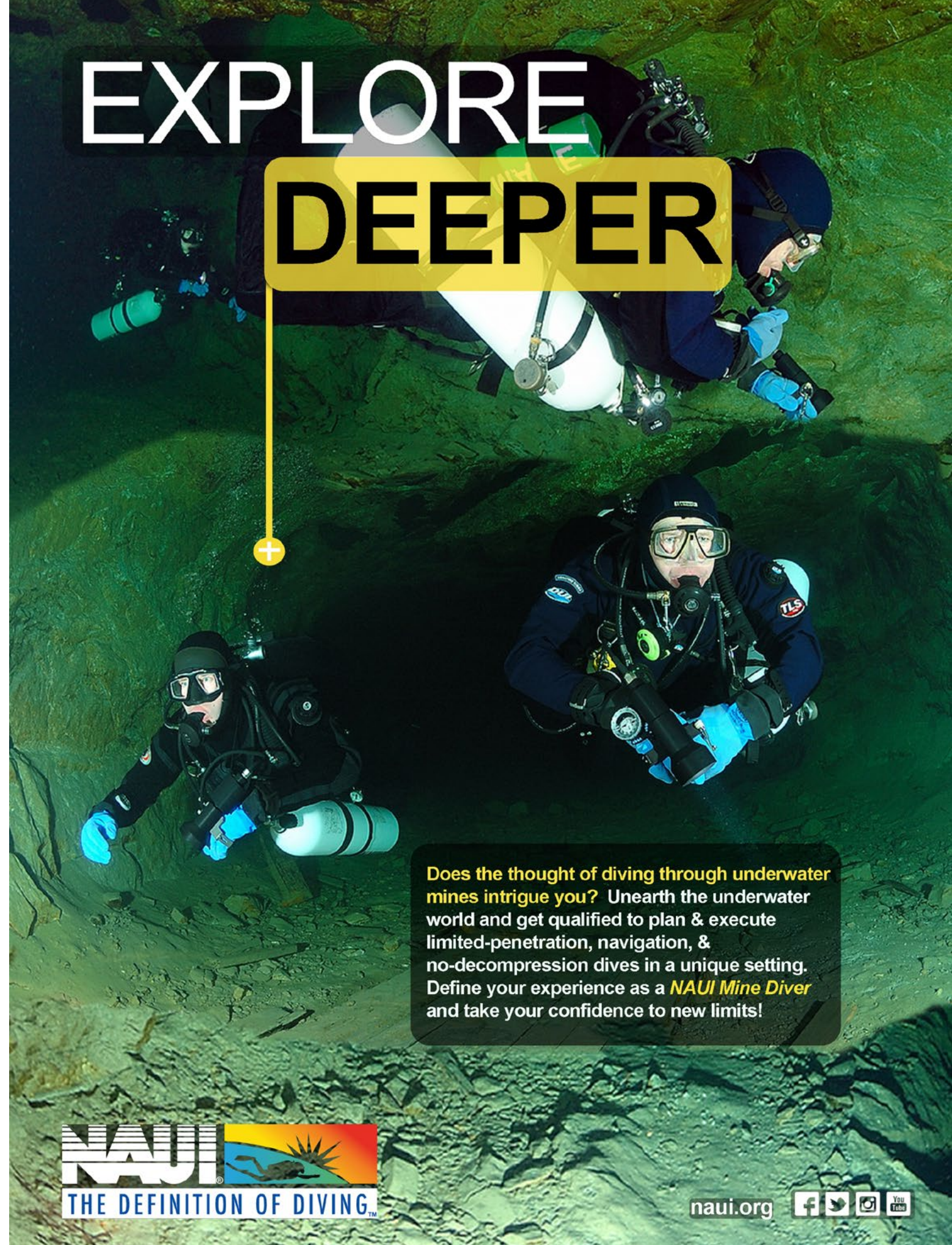
### Andra

Sunk on 6 April 1937, this vessel was built by the German shipyard in Hamburg. The ship was launched in July 1922 and named *Indra*. It had a length of 71m and was 11m wide. In the beginning of 1937, the *Indra* was sold and renamed *Andra*. With the new owners, the ship was chartered by Republican forces during the Spanish Civil War. She undertook several journeys to the north, bypassing the blockade by the Francoists. On 6 April 1937, the *Andra* was sunk by armed fishermen off the coast of Laredo.


Times were hard and uncertain during the Spanish Civil War, both at sea and on land. Many ships disappeared, and even if there were records, they were often inaccurate. This fact and




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THIS PAGE: Scenes from wreck of *Andra* off Spanish coast at Laredo

## Laredo

But until the final identification was made, the team's patience would be put to the test.

In July 2002, Ocean Project undertook a first exploratory dive. The dive team, consisting of Alberdi, Marin and Jordi Chias, had prepared perfectly for the dive. And they were lucky—they found the wreck of a large cargo ship. It stood upright in a depth of 85m, and had a length of 70m and a width of 10m. Due to bom-

bardment, the wreck showed some damage, but was still in very good condition, all in all. Many dives were necessary to make the final identification. Eventually, with the help of historical illustrations from insurance companies and European naval museums, the wreck's identity was verified without a doubt.

**España (formerly Alfonso XIII)**  
Sunk in 1937, the wreck of the bat-

tleship *España* is one of the landmarks of the Spanish coast. The mere mention of its name makes the eyes of all Spanish technical divers light up. Everyone wants to dive this wreck at least once, because it is of immense historical importance to Spain. The *España* class included three warships: *España* (the first one built), the *Alfonso XIII* and the *Jaime I*.

These battleships were developed, more or less, out of necessi-

the fact that the team members of Ocean Project had very little time for their research dives (due to the long cold winters of the Calabrian coast), explains why the search for the wreck extended over several years.

The dive team, led by Alberdi and Marin, decided in 2002 to explore a specific area off the coast of Laredo, where they suspected a major wreck. Historical records from the Spanish Civil War did not help the team much. Only information from local fishermen led to a site where a dive attempt was made.

At the end of March 2002, a dive was carried out at this site to a depth over 90m. But the only finds were some unidentifiable scraps. Undaunted, the team continued the search and finally made a discovery on 25 May 2002. At a depth of 85m, on the sandy seafloor, there were signs of a big wreck.



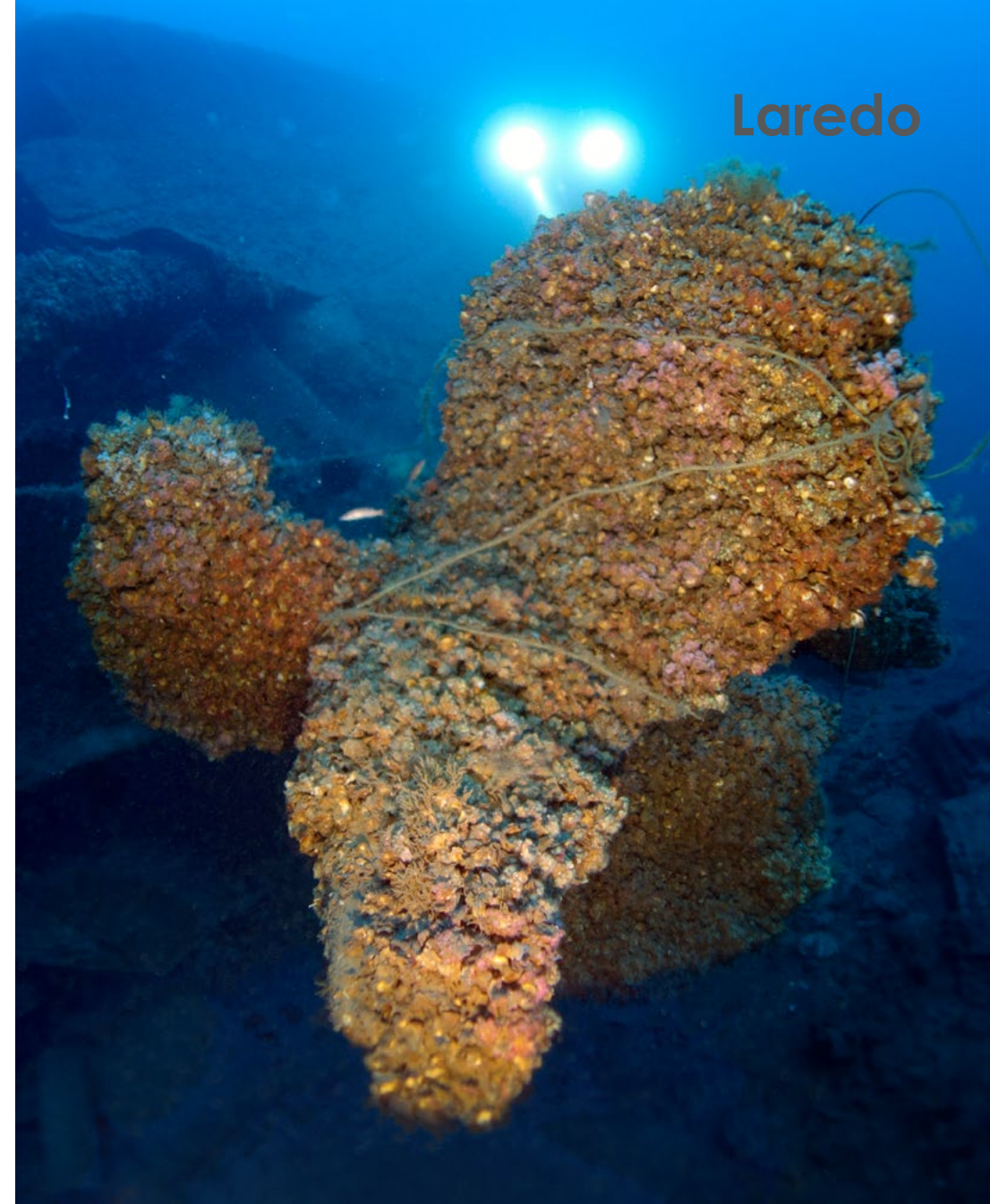




THIS PAGE: Scenes from the wreck of the *España*

precarious moment, the ship was also attacked by enemy aircraft. Nevertheless, almost all crew members (more than 700 men) were saved. Five sailors lost their lives. The *España* sank at the stern. The sea was about 75m deep at the collision site. When the ship hit the seafloor, it made a 180-degree turn. For some time, the bow still protruded from the water. Then, by the sheer pressure of trapped air, some metal plates were blown off the hull, and the *España* disappeared from the surface.

Although the position of the wreck was known, many years passed before a first test dive was undertaken to the *España*. Alfonso Gonzalíz Fernández, a local hard helmet diver, was granted permission to dive the wreck in 1984, after a year of fighting the authorities for a per-



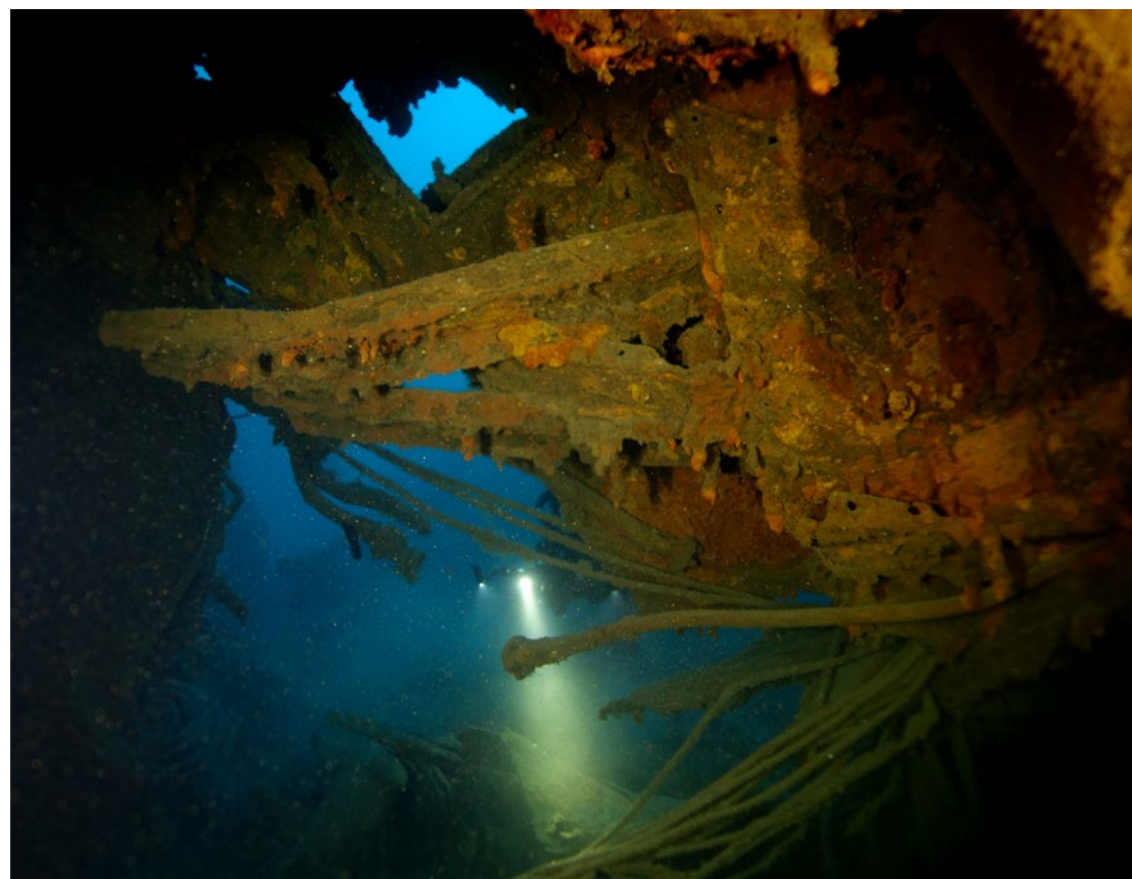
## Laredo

ty. Spanish finances were depleted after the Spanish-American War of 1898. The *Alfonso XIII*, named after the Spanish king, had its launch in May 1913 and was completed in August 1915. It was 140m long and 24m wide. In 1931, it was renamed *España*, after the first ship of its class. The ship was involved in countless heavy battles during the Spanish Civil War. Then, in the second quarter of 1937, tragedy struck—it was sunk at Santander, after running into a mine.

Foggy mist lay over the bay of Santander. It was the 30th of April 1937. Spain was in a civil war. The battleship *España* patrolled off the coast to find a blockade breaker. On the 140m long battleship, loaded with armaments and ammunition, crew members were on alert. A convoy of British ships

was trying to get to Santander.

The *España* took pursuit. In doing so, she doomed herself. A few days earlier, mines had been laid along the coast of Santander. In the zeal of the fight, the *España* came too close to this danger zone. After the commander of the ship became aware of the danger, he ordered an immediate change of course. But it was too late. The rear portion of the backboard side collided with a mine. The fall of the *España*, triggered by a mine laid by its own war division, could no longer be stopped. In this same



mit. It was to be a hard helmet dive, with air supplied from the surface, to a depth of over 70m! From today's point of view, it was a very daring dive. Fernández remained on the wreck for 15 minutes. Back at the surface, his report on the wreck was very negative. He said the visibility was very bad and that the wreck was upside-down and completely inaccessible.

It would be another 15 years before the next dive to the *España* took place. In 1999, after two years of preparation and research, Marin and Alberdi did their first dive on the wreck of the

battleship. They, too, made their first dives to the wreck with compressed air and a bottom-time of 15 minutes. However, their reports and underwater photographs drew a completely different picture of the wreck than the report by Fernandez.

On a dive trip during one of my stays in Spain, I happened to meet Alberdi and Marin and hear about the forgotten wrecks of Laredo. It was the first time I had heard about the *España*. They showed me pictures of the wreck and the telling of their first dives to the *España* kindled a desire in me to visit the wreck as soon as possible.



THIS PAGE: Scenes from the wreck of the *España*



was greeted with the impressive shapes of four giant propellers that stretched out in front of me, as I slowly made my way to the stern. My dive partners, Ivan and Mario, knew the wreck very well and led me first into an immense armory where the large guns were stored. In the underwater photographs from the first dives Alberdi and Marin made on the wreck, one can see the ammunition still properly stacked. Since then, everything has become strewn apart in disarray, and the ammunition holds are partly open, giving divers a free view inside.

This first dive was indescribable—brightly lit with sunlight and very good visibility on a wreck that had so many details, I did not know where to look first. Although

the *España* is upside-down, it is possible to penetrate the interior without too much difficulty in many places.

Two days later, we made another dive. This time, we chose the rear of the wreck as our goal. My dive buddies led me to, among other things, one of the large holds. Again, everything was full of ammunition. But not only that—I also saw lamps, wash basins, pipes, hand wheels, portholes and so much more, I could not remember it all. It was incredible! And I thought to myself, why should I fly all the way to Truk Lagoon on the other side of the



### Diving the *España*

These days, the window of time in which dives can be carried out on the *España* is restricted to a few months per year. From Laredo, the journey to *España* is about an hour. There are no fixed lines and buoys on the wreck, but Alberdi is such an experienced and great captain that he could find the wreck almost blindfolded.

He was also able to give me a choice of which part of the wreck (bow, stern or midships) I would like to dive, sinking the downline precisely on target, so there would be great views of the wreck for me.

We selected the stern area for the dive. The team diving ahead of us fixed the shot line to one of the four big propellers, and so I

world when I have something like this on my doorstep?

On my last day in Laredo, Alberdi once again took me to *España*. This time, we wanted to dive the bow, and my dive partners were Alberdi and Marin. They showed me “their” wreck, as no one else could. I think I could do 100 dives on this wreck and it would not be boring. The *España* is, for us, a “real” wreck, with all the characteristics and artifacts one could imagine finding on a historical wreck such as this. It is not an artificial reef, well-grown and populated with swarms of fish. It is a piece of living history. A video of the *España* can be found on my homepage at: Sabine-Kerkau.com, or on Vimeo: <https://vimeo.com/70069956>

### SS *Hochheimer*

A dive into the past. On 21 May 1944, in a bay on the Spanish Atlantic coast near Bilbao, the





THIS PAGE: Scenes from the dive to the wreck of the *Hochheimer*; Large conger eel (left) and common lobster (below) on *Hochheimer* wreck

a fish trawler. Besides, the artifacts they found clearly indicated that it was not a Spanish ship.

The porcelain found on the wreck came from the Royal Porcelain Factory in Berlin—Königliche Porzellan-Manufaktur (KPM). Some pieces showed the Imperial Eagle and swastika of the Third Reich. They came to the conclusion that this was the wreck of a German ship. The final identifica-

small German freighter, SS *Hochheimer*, sought shelter for the night. It was transporting a cargo of iron ore back home. The hands of the clock had stopped at 0:40. Almost the entire 25-man crew were in their bunks. They did not realize that their journey would find a dramatic end in a few moments, for the English submarine, *Scepter*, which was hunting for enemy ships in the Gulf of Biscay, had discovered the freighter.

The captain of the *Scepter* did not do things by half. He fired six torpedoes at *Hochheimer*. Seconds later, two explosions penetrated the silence of the night. The ship sank quickly. The Atlantic is cold this time of the year, and only seven of the 25 crew members survived. Seventeen sailors found their last resting place in the wreck, at a depth of over 90m.

Fast forward to the year 2007. No one even suspected the existence of the wreck off the coast of the North Atlantic coast. In 2007, mapping of the seabed



would show the outline of a possible wreck at almost 100m depth. First, it was assumed that it could be the wreck of a historically significant fish trawler from the civil war.

In 2008 and 2009, a group of Spanish technical divers dared to dive at the wreck. After this first dive, they came to the conclusion that the wreck could not be

tion of the wreck was achieved with the help of the on-board clock, which had stopped around midnight. The position of the wreck and the time on the clock corresponded with the logbook records of the *Scepter*.

### Diving the *Hochheimer*

In 2015, I took what proved to be an emotional dive to the wreck of

A memorial bouquet is placed on the wreck of the SS *Hochheimer*

the SS *Hochheimer*. Some years ago, I participated regularly in several "Deep Wreck Expedition Week" events in Spain. In 2015, the wreck of the SS *Hochheimer* was also on the program, but in Spain, the wreck was simply called the "Nazi wreck of Bilbao" at the time.

Since 2009, there have been no dives to the wreck, officially, so it was not surprising that almost every Spanish technical diver dreamed of diving on this almost untouched wreck. I was also enthusiastic. Such a dive is something special and one of the reasons I started diving.

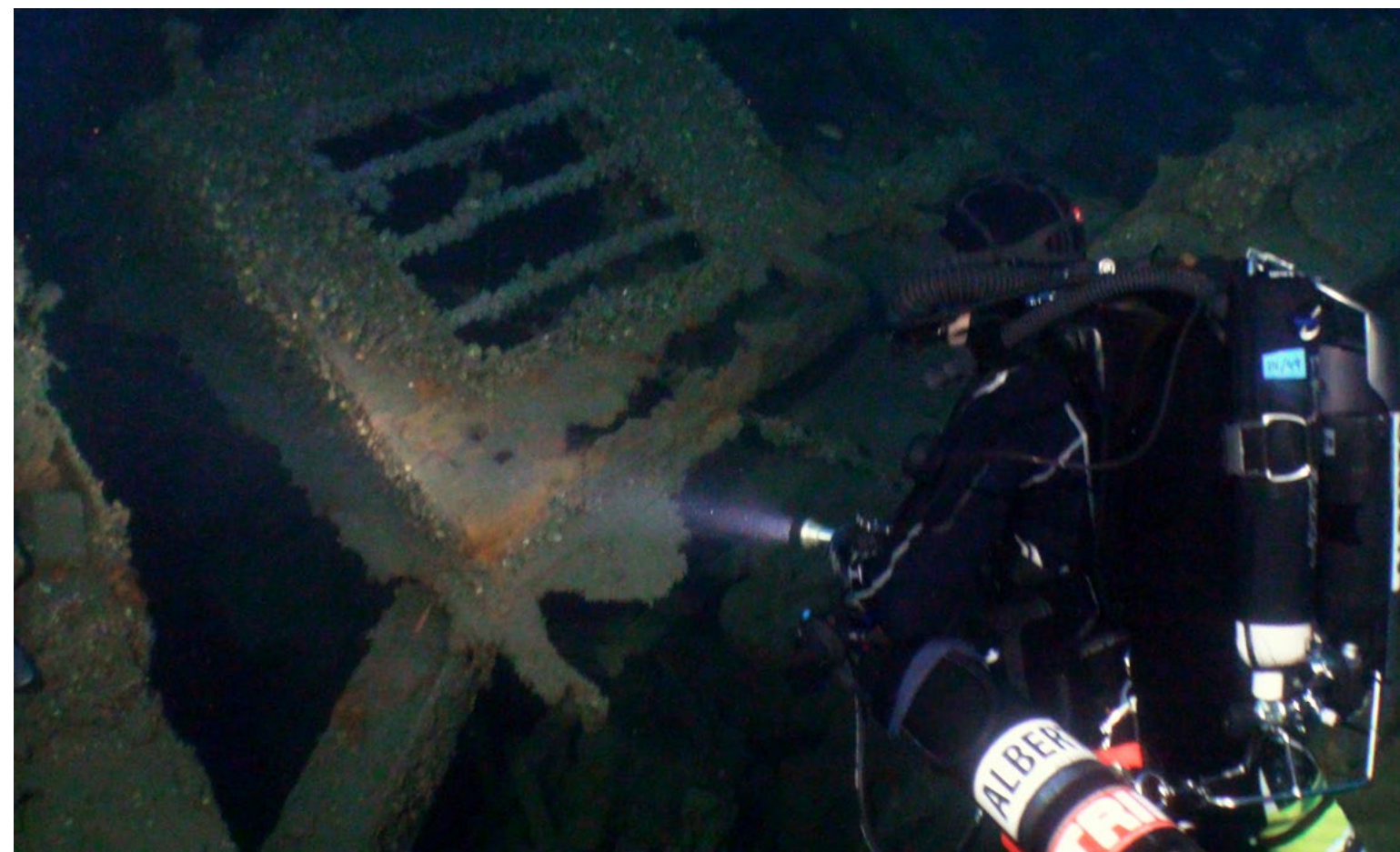
A dive on this wreck started at a depth of 90m, and diving conditions in the Atlantic can be very

demanding, so careful planning and preparation are therefore essential. In addition, I was the first German to see the wreck, 71

years after the loss of the ship. The 17 sailors who died at the time of the ship's demise weighed heavily on my mind. I could not explain



Laredo





THIS PAGE: Scenes from the wreck of the *España*



and one 40 ccf stage as well as a large camera.

First, we dropped a shot line into the depths. We had to be quick about it, because we needed every spare minute for the descent, or we would miss the wreck. From about 70m, I could see the first outlines of the wreck. The visibility was good and we were surrounded by deep blue twilight.

We swam to a big free-standing boiler and attached our weighted cable to it. Ten minutes had passed by this time, leaving just 15 minutes left for us to explore the wreck, before we had to start our ascent to the surface.

There was so much to see. The walls of the superstructure were partly disintegrated. Even without penetrating the interior of the wreck, I could see lots of porcelain lying in the wreckage. Among other things was a completely intact coffee pot and coffee cups, with the Nazi Imperial Eagle and swastika clearly visible on the

back of the porcelain. There was also a bathtub, sink, mirror frames and other artifacts that were easily identified. And everything was inhabited—I have never seen so many huge conger eels as those found on this wreck.

Just before we had to start our ascent, we took a quick look at the small cannons on the deck of the wreck. Much too soon, it was time to leave. At 25 minutes, we started our long ascent back to the surface. At our deco-stop, we had to decompress for two hours in the blue water. There was a lot of time to reflect on the incredible impressions of the wreck.

### Afterthoughts

My conclusion is that Spain has a lot to offer, both above and below the sea. There are spectacular wrecks and great cave systems, rarely ever dived, that will make any explorer's heart beat a little faster. Metaphorically speaking, there is often light, but sometimes shadows, too. If you go to



Laredo

why, but I felt that I should not visit the wreck empty-handed. I wanted to place a memorial bouquet with a German flag on the wreck. But I was not sure how the expedition team—which consisted of five Spaniards, an Englishman and myself—would react to this idea.

However, my concerns were completely unfounded, as I got full approval for the plan, and everyone on the team supported me in the initiative. They all gave me their promise that they would not explore the area of the crew's quarters, so as not to disturb the peace of those who perished

there.

The conditions at the dive site were optimal. There were almost no waves and only a minimal current. The expedition group was divided into three dive teams. Together with my dive partners, Alberdi and Marin, we made up the third dive team. Equipment assembled for my dive included a drysuit, JJ closed circuit rebreather, two 80 ccf stages



Rugged coastline of Laredo

Spain to do technical dives, you have to be aware that one must allow for a lot of flexibility and patience in the planning. One should always have an alternative plan in the back of one's mind, just in case.

Some areas can only be explored with local divers, since there are no logistics set up for technical divers. Based on my own experience and what my Spanish friends tell me, I know that the wind is very often a problem and long-planned dives can indeed be cancelled or postponed. I recommend that if you

can afford to travel by car, take as much equipment as possible with you. Rental of stage bottles and other technical diving equipment, such as bailout, is not always available, or can be difficult to find. ■

For more information, visit *Mundo Submarino, Laredo (Cantabria)* at: **Mundosubmarino.es**. Sabine Kerkau is a German technical diver, dive writer and underwater photographer based in Switzerland. For more information, please visit: **Sabine-Kerkau.com**.





*Limenendra bernosii* is a deeper dwelling nocturnal nudibranch, which seems a bit benign in coloration and nothing overly exciting. But once your light has alerted the sea slug of your presence, it unfolds and begins to move about, revealing its true neon colors. The hunt for this nudibranch is done in an exclusive manner, with a dive plan that involves staying OFF the bottom and restricting fin kicks, as these sea slugs love silty bottoms.

Text and photos by Mike Bartick

**Nudibranchs are a worldwide favorite for macro photographers, often leading divers on a “wild slug hunt” across the globe. Once these little gems capture your attention, it is very hard to break out of their magical spell. A gateway critter, if there ever was one, the nudibranch combines the beauty of our ocean and natural history in a photogenic and scientific symphony like no other marine animal.**

Often referred to as slugs due to their evolutionary path, the grand designs of nudibranchs are as fascinating and varied as there are slugs themselves. Each one of them has evolved in a special

manner to survive and reproduce in the many different and challenging habitats in which they are found. Cold water to warm water, benthic or pelagic and at every depth, nudibranchs occur glob-

ally and have even been found in brackish rivers.

Shooting photos of sea slugs is often the way many macro shooters start out. They shoot various finds from each dive, then look

them up in a marine species identification book. This often results in a collection of basic ID photos. While this is a common path for an underwater photographer to take in learning the craft, it often

sets one up for bad habits down the road. There eventually comes a time when shooters have the desire to take their images to a different level, but breaking the habit of shooting ID photos can



# Nudibranch Macro *Going Beyond the ID Photo*





## photo & video

*Miamira alleni* is a recently renamed slug, which resembles coral. Oftentimes, divers swim over or even look past these sea slugs, due to its clever camouflage in its extreme mimicry of its surroundings. The *alleni* can get huge and divers often refer to them as "battleships". They tend to be a longer living slug and have been seen on habitats that range from algae-covered sea bottoms to hard corals, walls and flat sea floors.

often be a challenge. One of the things that has helped me to shoot more creative images of nudibranchs began with learning about them first.

Knowing the food source of a nudibranch is an elementary yet effective way for hunting nudibranchs. Tunicates and algae are a great place to start, followed by hydroids and so on. It also helps to know a little about the anatomy and biology of nudibranchs.

### Anatomy in a nutshell

**Gill plume and cerata.** The word

"nudibranch" actually breaks down to two parts: "naked" and "gill". Most sea slugs have some kind of gill, or gill-like structure, which are clearly visible. Some (gill structures) are protected and therefore not visible, like in the case of plurobranchs or sidegill slugs. Different gill structures help to differentiate the species. Dorids have a visible gill plume while aeolids have cerata. Each makes direct contact with water in various ways and enables the sea slug to respire through conventional gas exchange.



*Kalinga ornata* is a true "lie and wait" predator, which hides just below the sand, with only the tips of its cerata exposed. Its prey—brittle stars—pass over them, unexpectedly alerting the *ornata* into action. The *ornata* suddenly emerges from the sand just behind the star and quickly tracks it down, snatching it up with quick vacuum action. And just as quickly as it emerged, it once again burrows down beneath the sand to wait for its next victim.

**Rhinophores.** This is a sensory organ located at the front of the subject that helps nudibranchs smell and detect food or prey. Rhinophores are varied in shape, depending on the species. Some are finned, some are smooth. Some retreat into a protective crown, while others retreat into a protective sheath. For photographic purposes, the rhinophores should be regarded as the eyes of the nudibranch.

**Coloration and texture.** The gaudy colors of a nudibranch serve as a visual defensive mechanism, which repels and warns predators of certain discomfort or death if they bite or consume the nudibranch. The small decorative dots along the foot of the nudibranch are oftentimes acid-secreting glands.

**Behavior.** Mating takes place when two nudibranchs of the

same species align themselves along the right sides where the reproductive organs are found. Mimicry of soft or hard corals, algae, even sponge make good subject matter for images. Egg laying is also a great behavior to capture. Oftentimes, the eggs are brightly colored, being just as colorful as the slug that has laid them.

**Diet.** Nudibranchs are extremely selective in their diets, feeding on only one food source. There are those that feed only on sponges or hydroids. There are also cannibal egg feeders and cannibals that feed on other nudibranch species.

### Photo techniques

For shooting sea slugs, technique can vary based on the species or size of the slug you find or set out to find. The macro, super-macro and wide-angle macro effect are

the three main ways of shooting them.

**Macro.** Standard macro using a 60mm lens is where many shooters enter the nudibranch world, using an SLR for the first time. Offering a close working distance and slightly wider angle of view, a 60mm lens is very forgiving and perfect for hunting random sea slugs.

**Super-macro.** Macro with a longer lens, such as the Nikon 105mm or Canon 100mm, is a bit more specialized, offering a narrowed angle of view with a slightly longer working distance. The narrow angle of view makes "filling the frame" a bit easier, and the longer working distance permits the use of diopters for super-macro. For that reason alone, it is a game changer. Both the 60mm and 100/105 offer the same magnification of 1:1. It is only the angle of view within the frame and working

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## photo & video

*Cyerce sp.* Any of the sacoglossid slugs pose a challenge to photograph due to transparency and the manner in which they move. In "herky-jerky, stop-start" movements, the cyerce lunges forward then stops, flopping its cerata over its facial features. Just as your camera focuses, it repeats the movement again. Back lighting helps to illuminate transparent subjects and brings out some of the subtle and intricate colors and patterns. Found near the base or hidden among Halimeda green macroalgae, the cyerce are a tough bunch to find and photograph.

distance that set these two lenses apart.

**Wide-angle macro.** The wide-angle macro effect is achieved using a wide-angle lens, either with or without a teleconverter. I use the Tokina 10-17mm fish-eye lens behind a Zen port. If I add the teleconverter, I also need to remember that my focal length will now be fixed, as the book gear will not mesh. And more importantly, I need to remember to use an extension ring.

Good super-macro images can be very frustrating to create, as there are a couple of challenges that beset the shooter. Depth of field can be extremely

narrow using diopters. This is exaggerated even more by the nearness to the subject. Stopping down to a minimum of  $f/22$  is a good start to gain some depth of field, as desired.

Lighting becomes an issue when stopping down. If you need more light, use the ISO setting and increase it to 100-160. Be careful with the  $f$ -stop, as diffraction now becomes extremely relevant.

### Movement and super-macro

Technique is vital to stabilize your camera when releasing the shutter. Make your camera light enough to eliminate wrist fatigue but heavy enough underwater



*Cyerce nigra*



to get stable. Placing your left hand under the lens port also helps to stabilize the camera.

Choose calm days or situations for super-macro shooting and avoid surge at all costs. Pay attention to the caliber of your subject's rhinophores or orientation within the frame.

Macro and super-macro is so much more than just making small things big. Try to create different compositions or use a variety of  $f$ -stops on the same subject to get a feel for what can be done to create

*Melibe colemani* is truly one of Nature's finest works. Resembling a ball of string, the developed muscle lines of this nudibranch are opaque yet held together within a translucent tissue. Its mouth opens like a massive fishing net, which it casts over the sand or soft corals to feed and to drag itself forward.







*Lobiger sp.* nudibranchs are found living on their food source, which is calaurpa algae. These sea slugs still have a visible shell, which has not been internalized. The lobes or cerata help the nudibranchs remain hidden or disguised, oftentimes right in the open. Take your time when shooting this sea slug and try to isolate the subject away from its habitat to create a stronger composition.

something a little different. Study your subject and try to bring out any unique behavior and function.

Once your subject is located, shooting photos of it takes on a whole new challenge. Something that looks very simple can sometimes become quite frustrating, as these little guys can put up quite an opposition once the

strobes begin to fire. The light from a modeling torch used for focus can also irritate a sea slug and cause them to turn their heads away from the lens.

### Drama with lighting

**Strobe angle and power** are always my first choice for creating drama in an image. Employ this, coupled with capturing

nudibranch behavior and using correct technical settings, and suddenly your standard ID photo becomes something unique and beautiful.

**Snoots.** Another tool that I tend to rely upon for lighting is a snoot. Using a snoot does a couple of things, which include eliminating the immediate surroundings in



your image. This is particularly helpful for subjects in a busy habitat. A snoot also works well with translucent subjects, as it creates a glowing effect that seems to radiate from within the subject.

**Wide-angle macro.** For larger nudibranchs, the wide-angle macro effect can open your

portfolio into a whole new realm. Wide-angle macro, or WAM, allows a shooter to create different compositions and can be plenty fun to do.

Similar lighting methods and strobe angles for the WAM effect prevail. I prefer using a Tokina 10-17mm fisheye lens on a crop sensor camera and using a small dome to get the wide-angle

macro effect. Keeping the outside edge of the strobe head in line with the front edge of the housing and aiming slightly back is very effective. Keep the shutter speed high to control the ambient light and watch for strobe flaring. If flaring occurs, adjust the strobes in a bit farther. I like to use my index finger just in front of the lens port to protect it from



*Alleni sp.* nudibranch and sun ball





## photo & video

Glow effect using side lighting (right); Filling the frame effect (below)

bumping the reef when making the approach. High *f*-stops or low, the depth of field is much greater and more forgiving than a macro lens.

### Composition ideas

**Alleni and sun ball.** After seeing a few images posted on public media of a sun in the frame with a nudibranch, I decided I had to try this myself, however, not on a composite or double exposure. I wanted to capture this image naturally, in the camera and on a single frame. We set out to explore and found one of my favorite Anilao superstar slugs to practice this technique. I could not have been happier with the results and have tried to recreate this image many times.

**Filling the frame.** This is one of my favorite techniques for shooting macro. The object is to fill the frame with the entire subject in a way that is



creatively appealing. This technique is great for creating the WOW factor or the appearance of a monster slug. I love bright colors as well for this type of image as it adds brightness and a punch of color to the ordinary black background portfolio. Flatworms work well for this too, so don't be a snob and share the love.

**The glow.** The glowing effect will take a little practice, mostly in recognizing the subjects it will work with the best. As mentioned, translucent subjects will carry the light well, using a side lighting method with your strobe, get close, get low and try to shoot up in a way that there is nothing behind your subject.

**Making it "black in back".** Very simply, shooting anything where there is nothing behind it allows you to capture your subject with a black background. By the same token, you can also get blue or pastels.

Background or ambient light

is controlled through shutter speed: 1/200 in an SLR will create a jet-black background, so nothing is behind your subject. If it is a nice sunny day, try slowing down the shutter and letting in the blue, like a dimmer switch on a lamp. For pastel colors, wide open *f*-stops, such as *f*/5.6 or *f*/7.1, are great for creating colorful bokeh effects, or out-of-focus areas as backgrounds.

### Afterthoughts

At the end of the day, hunting for sea slugs is almost as much fun as creating images of them. Challenge yourself to break away from old habits and dare to try something new. You might be surprised at what happens within the camera instead of what is achieved through Lightroom and Photoshop software. The above techniques and ideas work well with any critter, so experiment a little and have some fun. Now get out there and have an adventure! ■

*Mike Bartick is a widely published underwater photographer and dive writer based in Anilao, Philippines. A small animal expert, he leads groups of photographers into Asia's underwater realm to seek out that special critter. For more information, visit: [Saltwaterphoto.com](http://Saltwaterphoto.com).*



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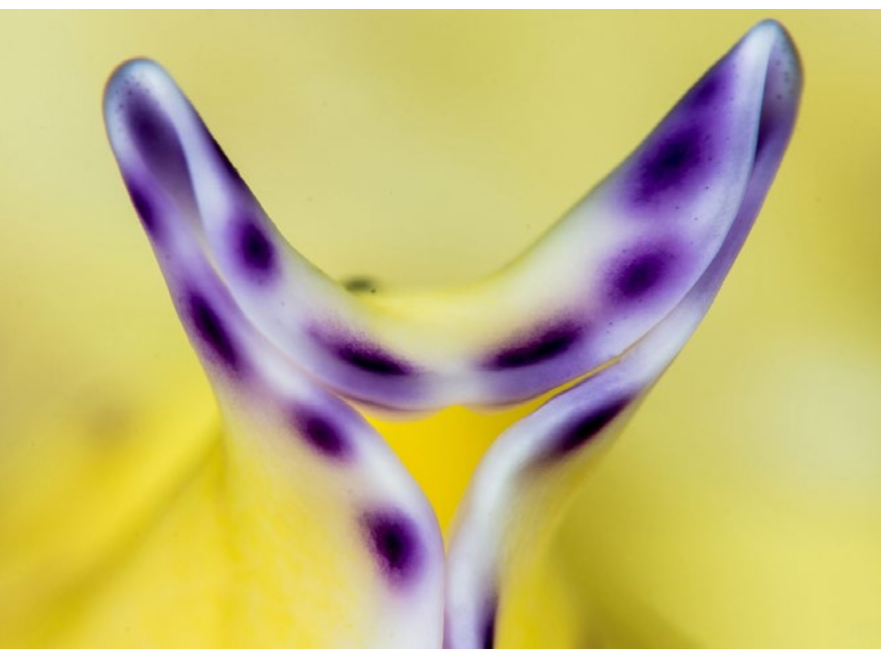
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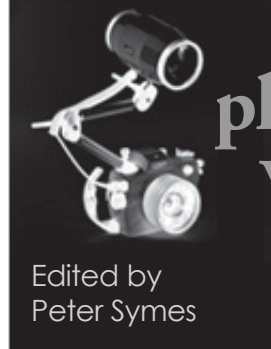


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# photo & video

Edited by Peter Symes

## Leo for phones

Fabio Benvenuti, principal of Italian brand Easydive, easily counts among the most innovative entrepreneurs I know in the industry; I always seem to be able to spot some interesting new pieces of kit whenever I find the company at expos.



This year's Boot Show in Germany was no exception, and this time on display was an ultra sleek housing for smartphones—both iPhones and Android models—called Leo3 Smart. Nicely machined and with a fine finish, the housing felt robust and trustworthy, yet sleek and lightweight.

Accessories (some are optional extras) include battery packs, arms, fisheye and wide-angle kit lenses (external), carbon arms and flash/lamp. The housing, which is depth rated to 150m, can also be provided with a vacuum test system. [Easydive.it](http://Easydive.it)



## Inon UCL-67

Compared to the INON UCL-100, which it supercedes, the new UCL-67 high magnification close-up lens offers three major benefits. These include increased magnification, improved image quality and interchangeable mounts. The UCL-67 is a 15 dioptre strength lens and this provides a magnification ratio, with a true 1:1 macro lens, of 2.7. The new UCL-67 uses four lens elements, compared to two in the UCL-330 and 165 and three in the UCL-100. It is also the first INON UCL lens to be designed for underwater use only. This level of correction is needed to keep pace with improvements to sensors in pro level cameras, especially full-frame and 4K models. With SLR cameras using 35mm size sensors now considered to provide the resolving power of some medium format cameras, the quality of lens systems is becoming an issue. This is why INON has corrected the UCL-67 specifically for shooting through water. As you would expect, the lens elements are glass and multi-coated to control flare, ghosting and chromatic aberration. The focus distance is set at about 50mm. [shop.inonuk.com](http://shop.inonuk.com)



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## Retra

The sleek-looking flash from Slovenia-based manufacturer Retra, best known for their optical snoots and other innovative accessories, is an attention-grabber in several ways. It is a similar size to Inon's Z-240 and Sea & Sea D1/D2 flashes but has a much cleaner control panel on the back (see small photo right). The right switch has nine manual exposure settings. Underwater photographer Alex Mustard recently took a pre-production model through its paces (see report posted on [Wetpixel](http://Wetpixel)), and among other things he pointed out, was how wide and even the illumination this strobe produced.

The tough aluminium housing takes four AA batteries, which will last for 200 flashes at full power and drive the 300 lumen pilot light for up to three hours. The flash can either be connected via electrical cable, with either a standard 5 pin or S6 connector—or optical cable. The beam angle is 95 degrees, or 110 degrees with wide diffuser, which affixes with a bayonet mount. The flash is depth-rated to 100m. The Retra is currently in early production, with first orders expected to start shipping in June 2017. [Retra-uwf.com](http://Retra-uwf.com)



## Fantasea wet lenses

Fantasea and AOI have also just released a new selection of three quality macro wet lenses. The lenses mount on the housing lens port and can be installed and removed during the course of the dive. They can be mounted on 67mm threaded lens ports and other dimensions by using an adaptor: the UCL-05LF wet macro lens with a +6 diopter; the UCL-06LF with a +12 diopter; and the UCL-09F super macro with a +12.5 diopter. Lens barrels are made from durable aluminium alloy with black hard coating. The AR (anti-reflection) coating on all glass elements assists in avoiding lens flare from the sun or artificial light sources.

[Fantasea.com](http://Fantasea.com)







# 3D Photogrammetry

*An Innovative Specialty Course Developed by NAUI Finland*

Text and photos courtesy of Pasi Lammi and Pasi Laine of NAUI HQ and NAUI Finland

**What's so special about NAUI training? Why did you choose to become a NAUI Instructor? NAUI Leaders answer these questions in many different ways, but one of the most common responses focuses on NAUI's innovative approach to dive training and the academic freedom and flexibility NAUI affords its Instructors.**

One such example stems from the option NAUI Instructors with a particular area of expertise have to develop and teach

their own Instructor Specified Specialty courses, as well as share those courses with the NAUI Membership. Current Instructor Specified courses include Boat Diving, Aquaculture Fish Diver, Full Face Mask Diver, Rescue Skin Diver, Surface Supplied Diving, River Diver, and many more.

In addition to the variety of NAUI Specialties included in NAUI's course offerings, Instructor Specified Specialties allow NAUI Instructors and their students to explore a wider range of dive environments and cover diving-related topics in even greater depth and breadth.

One of the latest additions to NAUI's lineup of Instructor Specified courses comes to us from NAUI Finland and is representative of NAUI's flexible and innovative approach to training— NAUI 3D Photogrammetry.

The NAUI 3D Photogrammetry Instructor Specified Specialty course was developed by NAUI Recreational and Technical Instructors Pasi Lammi (NAUI 57705) and Pasi Laine (NAUI 42324).

Photogrammetry is the technique of taking multiple overlapping photographs and deriving measurements from them to

create 3D models of objects. Basically, still images are used to create 3D models. This technology was originally developed for aerial photography, but Lammi and his colleagues have shown that it works equally well underwater.

The idea for the course stemmed from Lammi's passion for diving in caves, mines and wrecks and wanting a way to show people what that sort of diving was like. He also wanted a means to help himself and fellow divers better visualize and experience their dives. For a more thorough explanation of the course and its development and uses, Lammi has provided the following:

"I was hooked on wreck diving

right from the beginning. After completing my basic training, my first dives were to shallow sites near the city of Porvoo, Finland, where in the dim light of my tiny torch and poor visibility, the wrecks seemed mysterious and scary. I started thinking that there must be a way to get a bigger picture, but back then I had no idea where this thinking would take me.

"I soon found myself taking the NAUI Advanced Scuba Diver course and training to become a boat skipper so that I could visit the places I wanted, when I wanted. At this point, there was no turning back, and I was looking towards different specialty courses, going further and further.

"With growing experience and knowledge, I started to dive new sites, sometimes in clear, warm

waters abroad, but in the end, I always returned to the cold, dark waters of the Baltic where my heart belongs.

"My initial anxiety of diving wrecks soon changed into deep interest of their fate, and how they helped to shape our his-

tory. I wanted to document and preserve what I saw.

"Despite participating in numerous projects with various teams of experts, I still vividly recall how it felt to descend for the first time to the wreck of the Russian Pravda P-1 submarine in 2012, or the unforgettable HMS *Russel* battleship off the coast of Malta. But on all those expeditions and wrecks, there were challenges to getting

a holistic picture. Poor visibility, limited bottom times, and the sheer size of some of the sites posed challenges that I wanted to overcome.

"Modern technology with its computers, advanced software, high powered lights, high capacity batteries and high resolution cameras, offers possibilities to bring these hidden treasures out from the depths and show them to the world. Over the past two years, I have been involved in expeditions to create 3D models of numerous underwater sites.

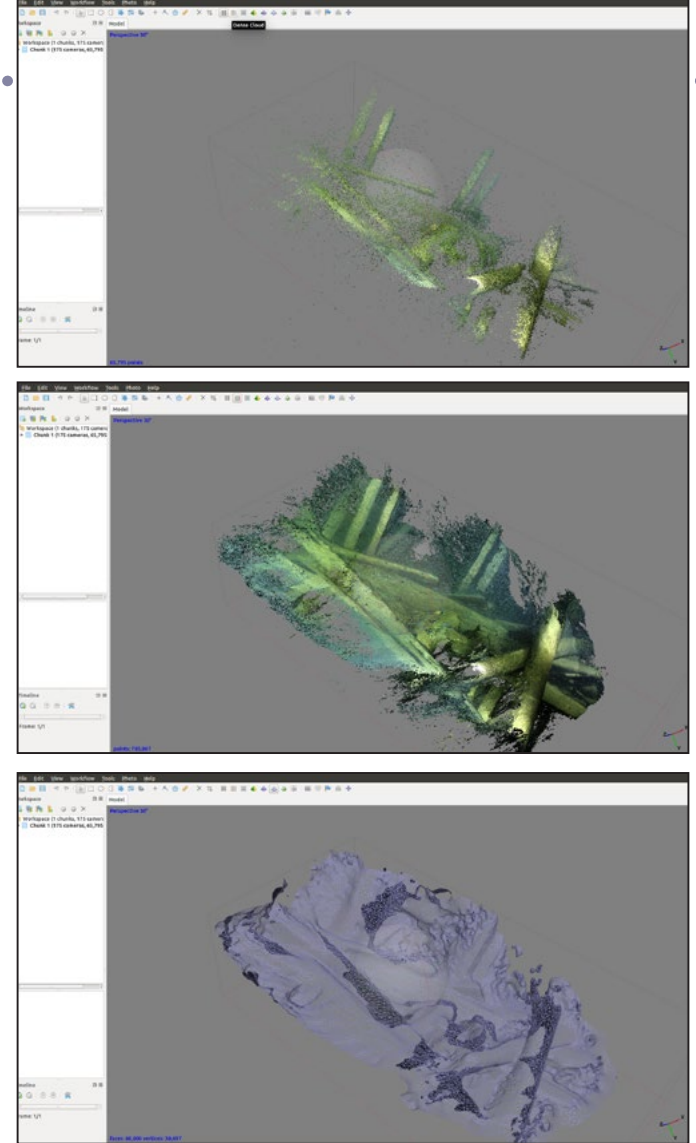
The team I work with includes extremely talented people, including a pioneer in Finnish 3D photogrammetry, Kari Hyttinen.

"Sometimes we obtained results on the trip back to land, while on other occasions, even after months of intensive manual labor, there was still work to be done to finish a project. As there was no training in underwater photogrammetry, we had to overcome the challenges with trial and error and endless rolls of the proverbial duct tape and cable ties. We decided to formalize our knowledge and lessons learned and package it up so that others would not have to make the same mistakes we did. This created the basis for our NAUI 3D Photogrammetry course standards.

"The NAUI 3D Photogrammetry course includes eight hours of 3D photogrammetry basics and hands-on land training to understand what kind of issues affect

the end result. The required software and hardware is discussed and how the resulting models can be utilized. The course also includes a dive to document a site of one's choice to record material for model rendering." ■

*If you would like to find out more about the NAUI 3D Photogrammetry course or submit your own ideas for new NAUI Instructor Specified courses, contact the NAUI Training Department at: [training@nau.org](mailto:training@nau.org). If you would like to participate in the NAUI 3D Photogrammetry course, contact Pasi Laine, NAUI Rec and Tec Representative of Finland and NAUI Examiner Trainer, Technical Instructor Examiner trainer, at NAUI Finland directly at: [pasi.laine@nau-finland.com](mailto:pasi.laine@nau-finland.com).*





# Robert Paris



## P O R T F O L I O





From *Out of the Blue*, by Robert Paris. Acrylic on canvas, 30 x 40 inches

PREVIOUS PAGE: *School's Out!*  
by Robert Paris. Watercolor on  
paper, 14 x 7 inches

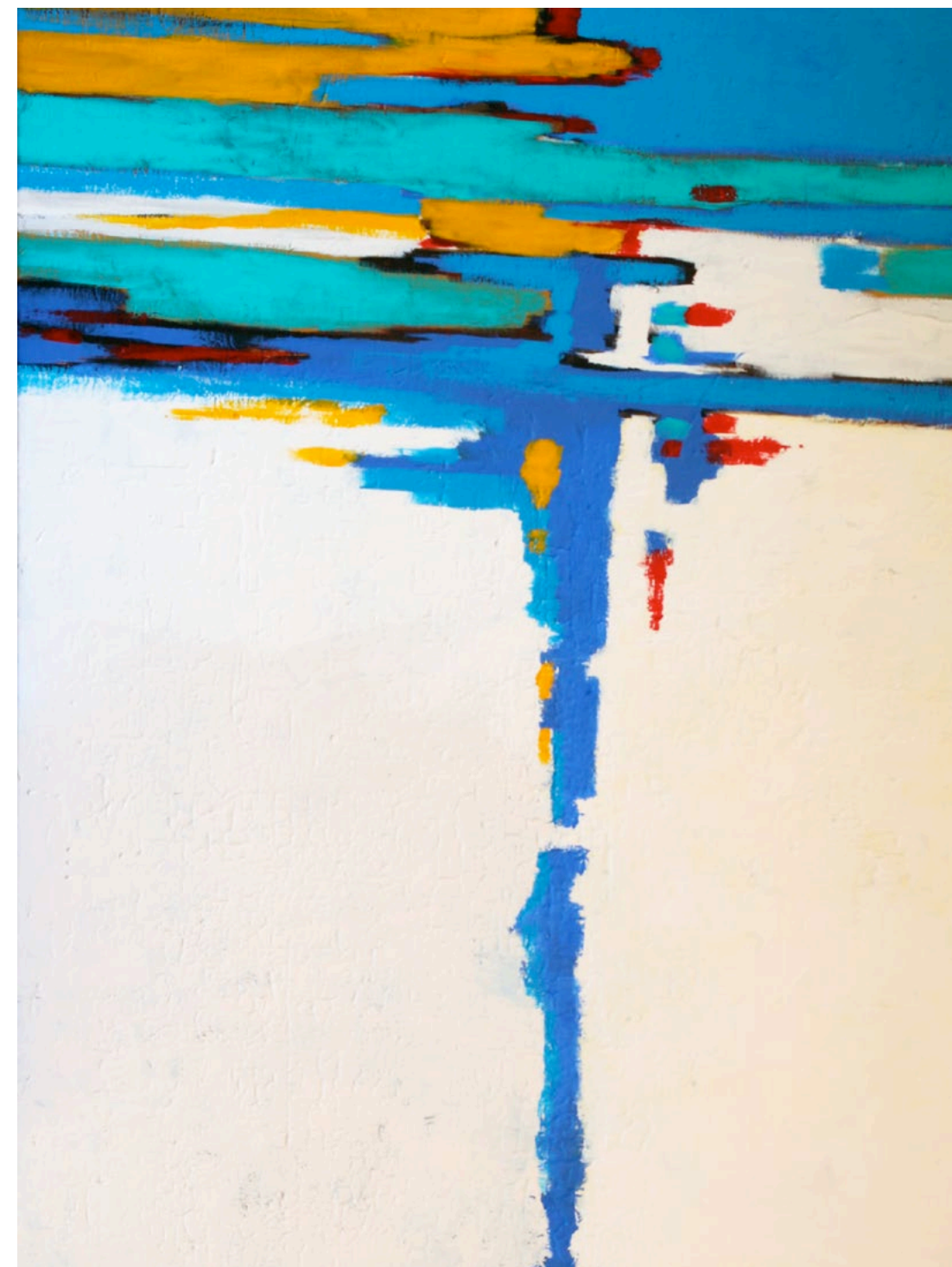
*Mast in the Harbor*,  
by Robert Paris.  
Acrylic on canvas,  
40 x 30 inches

Text edited by Gunild Symes  
All artwork by and photos  
courtesy of Robert Paris

**Originally from Virginia, American artist Robert Paris grew up loving the outdoors and the natural world around him. After a career in graphic design working with marketing groups, he decided to give up the corporate life and pursue his passion for painting. Today, if he's not fishing or gardening, he is creating sublime watercolors of fish and acrylic paintings of marine environments, with some close-up compositions of water and reflections so photo-realistic that they become nearly abstract in color and form.**

*X-RAY MAG:* Tell us about yourself, your background and how you became an artist.

RP: I grew up in the mountains of Virginia where I spent most of my time fishing and floating on the small rivers and streams. This exposure to rushing water created a lasting impression on me that I still carry with me today. I attended the Art Institute of Atlanta and became a graphic designer/creative director. After 15 years of doing this, I felt it was time to dedicate myself to painting full-time.



So, in 2002, I started this latest chapter in my adventure.

*X-RAY MAG:* Why fish and marine life? How did you come to this theme and how did you develop your style of painting?

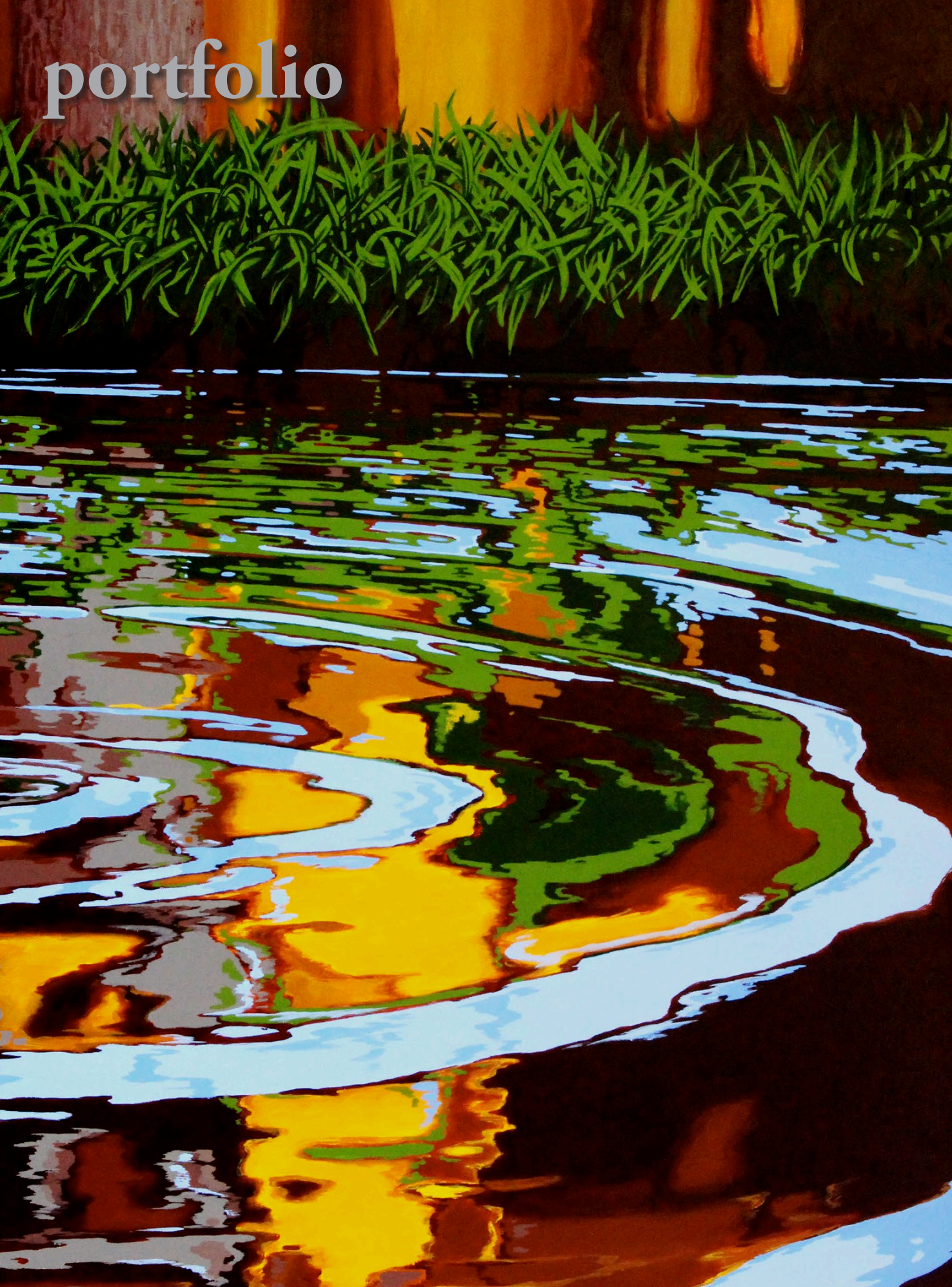
RP: My grandfather took me fishing

when I was four years old, and I have been fascinated with aquatic life ever since.

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

RP: I really don't have a set process. I get an idea or see something





*Ripple Effect*, by Robert Paris. Acrylic on canvas, 30 x 40 inches



*Bluegill in the Brush*,  
by Robert Paris.  
Watercolor on paper,  
14 x 10 inches

## Robert Paris

The painting, *A Walk on the Beach*, was inspired by countless hours on the Carolina coast. I used a technique in which I mixed my acrylic paints to be liquid and then poured it on, slowly allowing gravity to pull it down the canvas. It is a real back and forth process, but in the end, it created the feeling of being at the edge of the surf.

*Ripple Effect* was inspired by an object striking the water's surface, creating the recognizable rings. Again, I was trying to branch out of my usual style and tried to keep the fine details to a minimum.

Lastly, the painting entitled *Water at Night* was my attempt to capture a memory from a trip to Key West,

that peaks my interest, and I try to execute it—some paintings work and some don't.

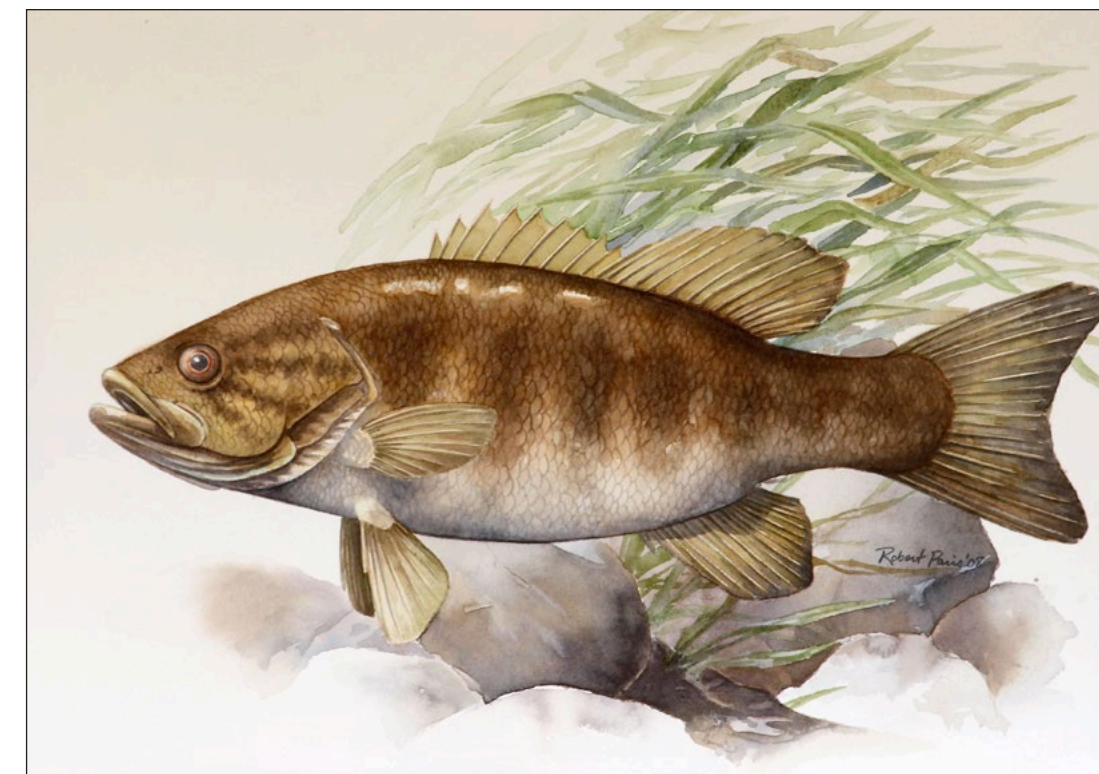
**X-RAY MAG:** Tell us about your fish watercolors. They seem to be very fresh and lively, yet rooted in tradition. Were you inspired by the 18-19th century naturalist and ichthyologist illustrations? And how did you get such detail in the paintings?

RP: My watercolors of individual fish came about in two parts. Originally, I was doing sketches or studies for some wood carvings that I wanted for my personal collection. After completing these carvings, I thought that they would make nice paintings in a [John James] Audubon style. I love the combination of fine detail and subtle color against the stark white background. Fine-detail work comes naturally to me and I believe it is this fine detail that brings these images to life.

**X-RAY MAG:** Your paintings of water surfaces are intriguing. Please tell us about your inspiration and approach here. What was it about the water that inspired you to create paintings such as *Ripple Effect*, *Mast in the Harbor*, and *A Walk on the Beach*? What is the story behind each painting?

RP: As I mentioned before, I have been a fisherman since I was a young boy and have had the opportunity to experience moving water in every form—from the smallest mountain stream to the breathtaking open ocean. Through my work, I try to capture these memories.

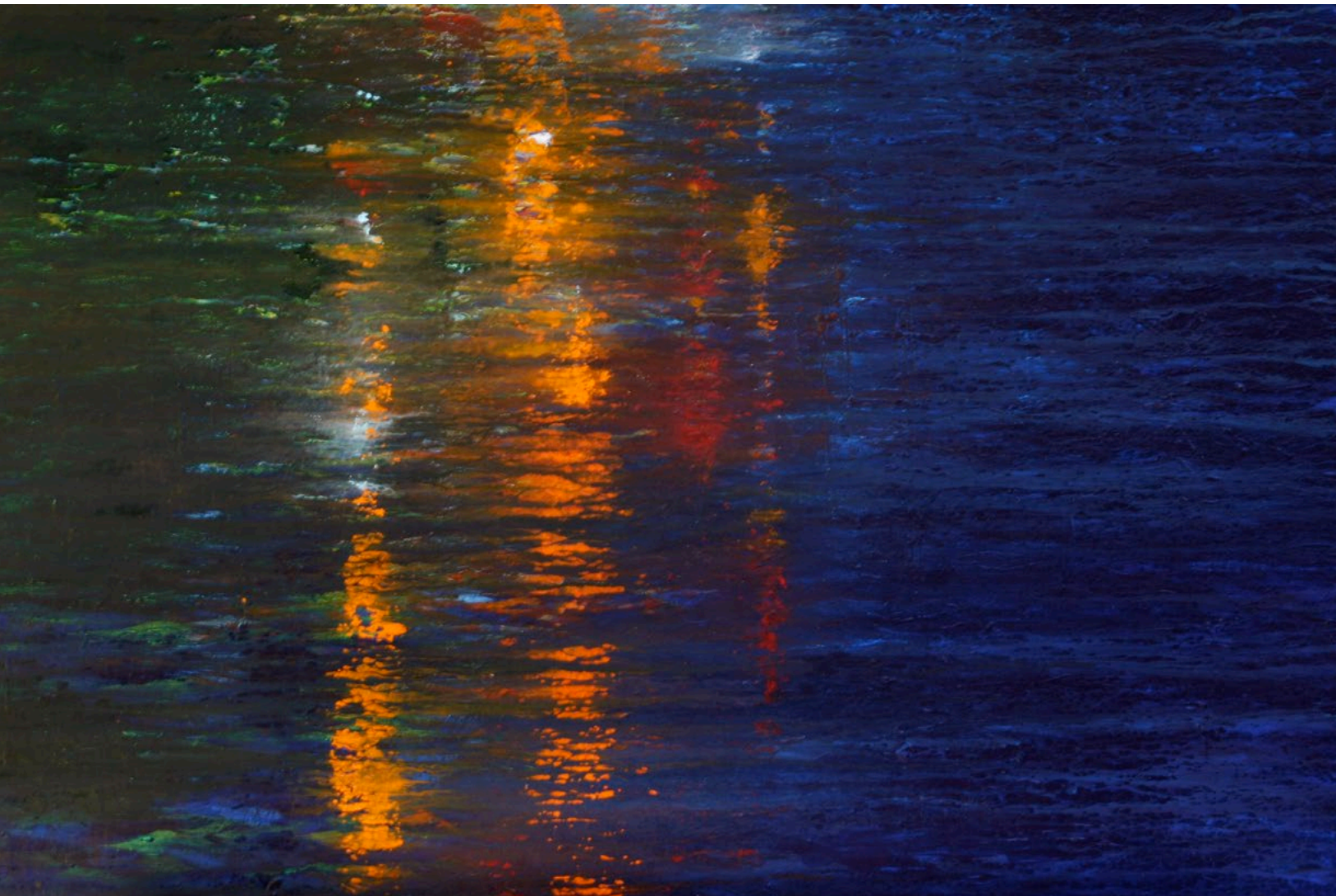
Water is a wonderful and challenging subject for a number of reasons. It is alive. It is seldom a single color and it is a mirror of all that surrounds it.



*Smallmouth Bass in the Weeds*, by Robert Paris. Watercolor on paper, 14 x 10 inches



*Water at Night*, by Robert Paris. Acrylic on canvas, 36 x 24 inches



Florida. My wife and I love to have dinner and stroll along the harbor at night. The lights danced in the light surface chop.

*X-RAY MAG*: Mast in the Harbor is such a close-up, close-cropped, photo-realistic yet ingeniously minimalist composition of a reflection on water, it looks nearly like an abstract painting... Please tell us your inspiration here and what your approach or purpose was in this painting.

RP: In my painting entitled *Mast in the Harbor*, I was trying to create a more modern-styled painting than my usual work. This was ac-



*Bluegill*, by Robert Paris. Watercolor on paper, 16 x 12 inches



*Hatch*, by Robert Paris. Acrylic on canvas, 16 x 20 inches



THIS PAGE: Original artworks by Robert Paris—*Mahi*, watercolor, 25 x 10 inches (right); *David and Katie's Water Garden*, acrylic on canvas, 24 x 18 inches (lower right); *A Walk on the Beach*, acrylic on canvas, 48 x 48 inches (below)



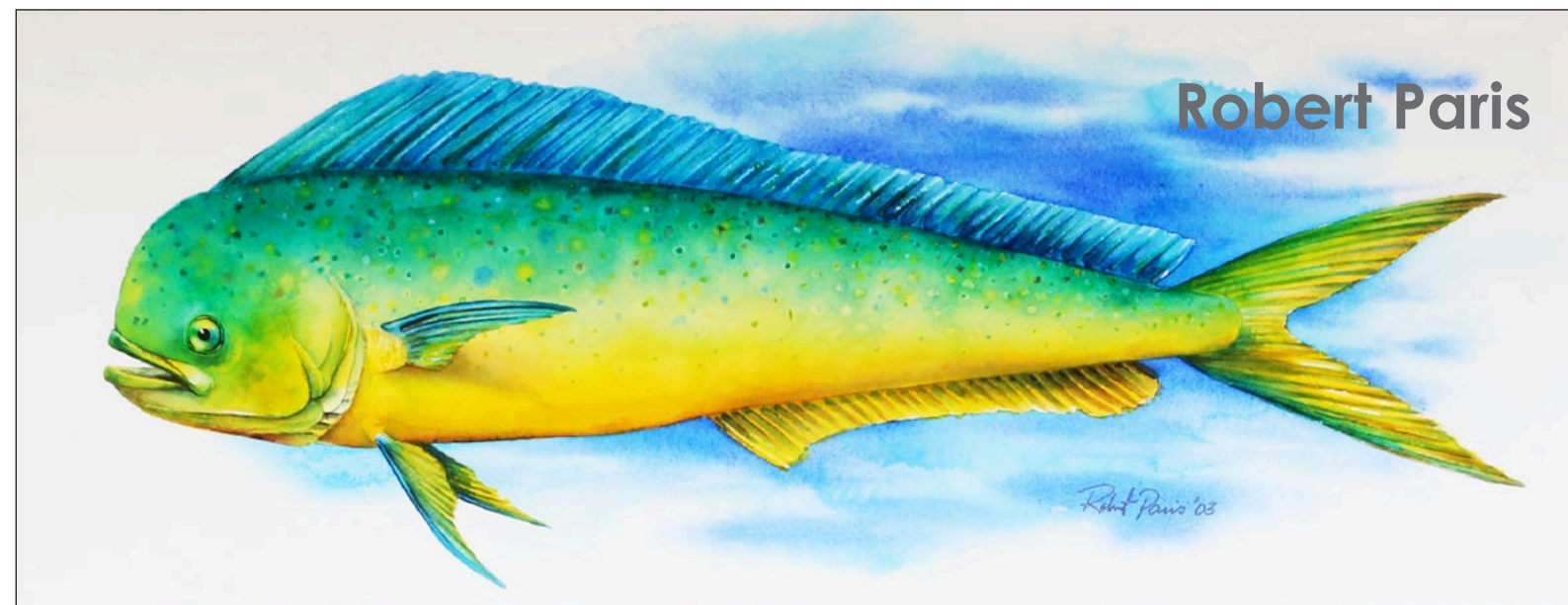
completed by keeping my brush strokes very loose and inverting my colors. By inverting I mean, that the water was painted white and the reflection of the sailboat was given the colors found in the water.

**X-RAY MAG:** *Are you a scuba diver or snorkeler and how have your experiences underwater influenced your art?*

RP: I have never been scuba diving and rarely been snorkeling.

However, I understand the attraction to the sport and can only imagine the peace it must bring the diver.

**X-RAY MAG:** *What are your thoughts on ocean and fresh-*



Robert Paris



*water conservation and how does your artwork relate to these issues?*

RP: I know that without the healthy natural and man-made reefs and tidal estuaries, the sport of fishing would be greatly impacted. I wish more people thought about how their day-to-day activities impact these resources.

**X-RAY MAG:** *Why art? Why is it important?*

RP: Why art? I really don't know. I was born with a creative gene,

which drives me every day. I try to create something positive for others to enjoy.

**X-RAY MAG:** *What are the challenges of being an artist in the world today?*

RP: The biggest challenge for me is trying to put all of my thoughts on paper or canvas. There are just not enough hours in a day.

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

RP: I like a quiet environment and try to convey that with my work and subject matter.

**X-RAY MAG:** *How do people respond to your works?*

RP: Most people think it is a photo—it is only after they have been shown that it is a painting that they really start to study the details and understand the complexities of the work. Most people young and old seem to enjoy my work because it usually reminds them of a fond memory.

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

RP: Lately, I have not been painting as often because I have been building furniture from reclaimed lumber. This has been a fun and challenging new way for me to explore my creativity. I work in cycles—sometimes you have to change things in your routine to get a new perspective. ■

*For more information or to purchase original art, please visit the artist's websites at: [Etsy.com/shop/robertparis](http://Etsy.com/shop/robertparis) or [Bluewater-design.com](http://Bluewater-design.com). And on Pinterest at: [Robert Paris Fine Art](http://Robert Paris Fine Art).*