X-Ray Mag

GLOBAL EDITION
September 2015
Number 68

Azores
Blue Sharks

WWII Wreck
SS Seniority

British Columbia
Nanaimo

Florida's
Black Water

Tech Wreck
Helldiver Plane

Training
Children & Scuba

THE PALM BEACHES & THE SPRINGS
Diving in Florida

COVER PHOTO BY WALT STEARNS

DIRECTORY

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COVER PHOTO: Coral reef scene, Palm Beaches, Florida, USA
Photo by Walt Stearns

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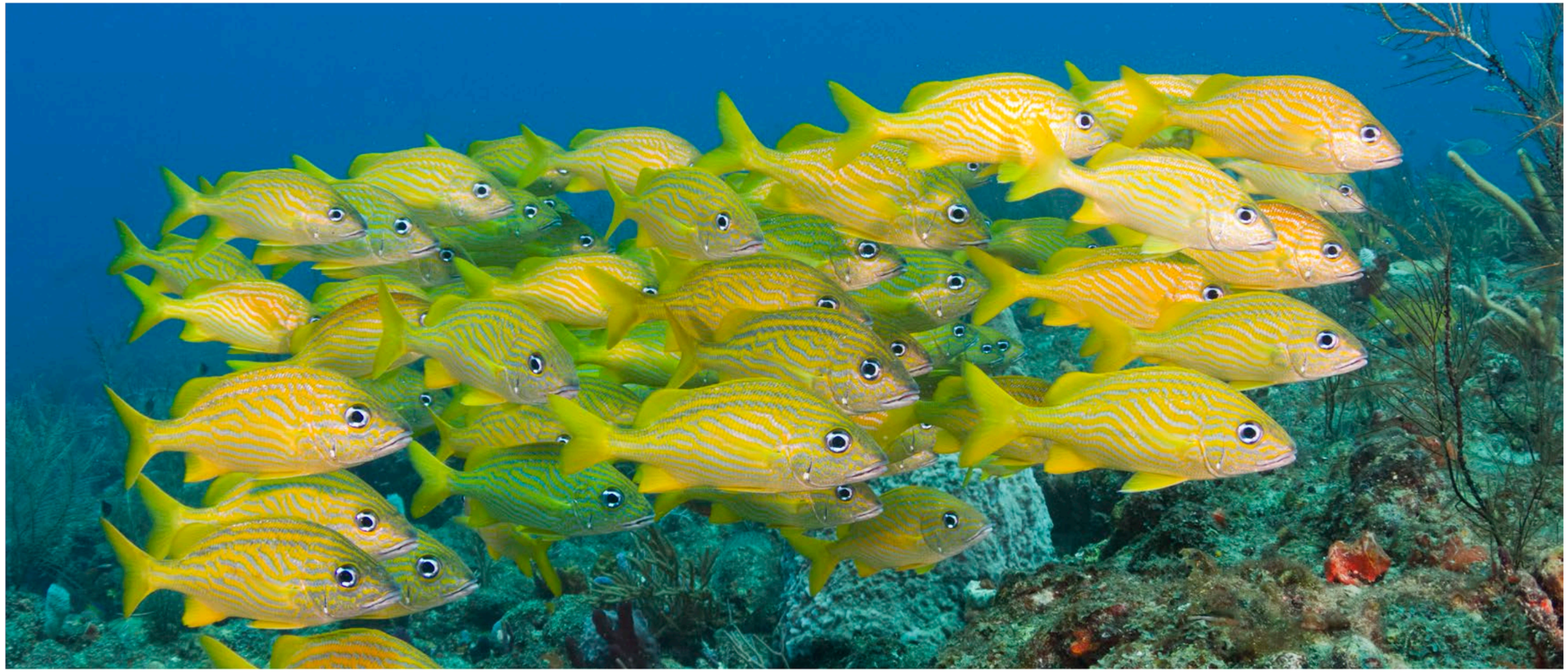
School of French grunts, Palm Beaches, Florida, USA. Photo by Walt Stearns



columns...

plus...

Children & Scuba

Ed. — In this issue, we feature a section on children and scuba with articles on recommendations and considerations, books for kids and news from one of the largest children's dive clubs in the world based in Malaysia—Kids Scuba. X-RAY MAG is pleased to present a guest editorial from the award-winning club's founder and director, Syed Abd Rahman.

With the Kids Scuba program that we started in Malaysia in 2004, we have managed to help children in Malaysia to achieve their dreams, to take up scuba diving as a sport and eventually become divers.

These lovely children then further develop their scuba skills themselves, with the regular pool sessions we offer, coupled with the Kids Scuba Camps organized three times a year at the beautiful marine park islands in Malaysia. This is a very good initiative, as it involves excellent family bonding.

Scuba diving is a sport that one can relate to recreational sports, marine education and career development all at once. For example, high school students who complete certification from Open Water up to the Dive Master level would be able to further themselves by taking marine-related courses in any university anywhere in the world, or they could opt to work as a divemasters at dive resorts anywhere in the world.

Is it safe?

Dangers and hazards come in every sport, be it soccer, gymnastics, rugby, wall climbing, mountain climbing and many others. I would say that scuba is a sport that emphasizes safety, discipline and a buddy system. One must learn and master scuba equipment and underwater scuba skills thoroughly during the scuba courses. I would say that that there are more *driving* accidents than there are *diving* accidents.

As scuba diving for younger kids starts in a pool session, there are no risks involved; the training is similar to competitive swimming and springboard diving. The only difference is that we use scuba equipment like tanks, regulators and weights.

PADI has come up with a very good foundation course for kids called the PADI Seal Team. During the five aqua mission sessions, the program teaches us adults, as instructors, to loosen up and enjoy the water with the kids. This comes with a special approach, analogies and safely procedures in handling kids while scuba diving in the water. The best part if it is to "have fun with the kids" and they will remember the experience.

I believe that when it comes to teaching children, it's all about pure education and a foundation that helps kids learn the right scuba skills.

Teaching conservation

In addition, there are a few things about which we can educate youngsters in regards to conservation of marine life, via Project Aware, for instance, including some important things we can do as citizens:

- Not throw rubbish or plastics into rivers that lead to the sea.
- Conduct regular marine awareness programs in schools and universities.

Children & Scuba (continued)

 Plant more mangroves at beaches to reduce erosion.

 Conserve mangroves which also act as estuaries for juvenile fishes and provide breeding grounds for fishes.

Pros and cons

In economic terms, however, we're talking about a very small return from teaching scuba to kids. That is one of the main reasons why more instructors do not teach children, as it involves small profit margins, while requiring lots of patience, love, commitment and dedication in ensuring that the children become good divers with good scuba skills to potentially become future dive instructors.

Indirectly, there is also more work involved in teaching children compared to teaching adults, but it is very rewarding work, down the line, in years to come, when one sees the kids themselves growing up and becoming divemasters, instructors and marine-related scientists.

Personally, I think kids actually make better divers than adults do specifically because they started young—just like in the sport of gymnastics, star Olympians started at a very young age.

The negative claims of some scuba instructors about training kids are untrue; the risk and stressful situations they describe actually stem from the instructors' lack of proper training in handling children and a lack of patience and commitment, not the students themselves. The kids will follow suit.

Since 2004, with our Kids Scuba Program, we have managed to train children at many levels and even help hyper and timid children to become totally the reverse. Thus, with the enjoyment of proper training and education and instilling a good buddy system, we compliment and motivate kids to excel in the sport of scuba at a level that not many adults are able to achieve.

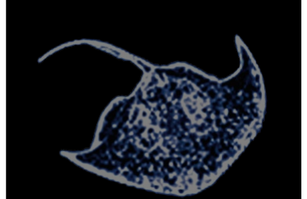
Reaching out

We have now extended our expertise and exposure of scuba diving to orphanage children and teenagers in Malaysia and, most recently, to disabled youth.

Lastly, to me, it's all about discipline, passion, patience, lots of love of the sport and commitment to ensuring the younger generation learn more about scuba diving and appreciating the marine environment. This only comes about with a good foundation and proper scuba skills and techniques, while having fun. This, I'm sure, will benefit the marine environment and the ecosystem in future years to come.

— Syed Abd Rahman
Director, Scuba Educator
PADI/ EFR Instructor
Master Scuba Diver Trainer
Kids Scuba Malaysia

Based near Kuala Lumpur, Kids Scuba is a PADI 5-Star Dive Center and winner of the PADI Youth Diver Education Award as well as the PADI Outstanding Contribution to the Diving Industry Award. For more information, visit: ***Kidsscuba.com***



News edited
by Peter Symes

from the deep

NEWS

Is there any stopping to the lionfish invasion?

Lionfish have been described as one of the most aggressively invasive species on the planet. Can they ever be brought under control?

WALT STEARNS

The rapid spread of lionfishes along the US eastern seaboard, Gulf of Mexico and Caribbean was the first documented case of a non-native marine fish establishing a self-sustaining population in the region. While over 30 species of non-native marine fishes have been sighted off the coast of Florida alone, it was not until the lionfishes, which were first reported off Florida's Atlantic coast in the mid-1980s and became numerous around 2000, that any species had demonstrated the ability to survive, reproduce, and spread successfully. So what made the lionfish succeed where other species did not?

Foremost on the minds of scientists is the lionfishes' predatory behavior, which had a significant negative impact on native species in the newly invaded ecosystems. Research done by Oregon State University indicated that that in some cases lionfish will continue to hunt until the last fish of a local population is dead—a finding that the scientists called "alarming".

"Lionfish seem to be the ultimate invader," Kurt Ingeman, a researcher with the OSU College of Science stated in a press release. "Almost every new thing we learn about them is some characteristic that makes them a more formidable predator."

Overeaters

The sluggish moving lionfish may not be recognized as a predator by other fish, leading to high mortality even when shelter is abundant.

Lionfish are also very efficient hunters, are well-defended themselves by poisonous spines, and can thrive at deep levels in the ocean. They tolerate a wide range of habitats and water conditions, reproduce rapidly most of the year, eat many different species of native fish and may overeat rare species.

Apparently lionfish feel no need to move on for better or easier hunting. A 2014 report by OSU concluded that lionfish, by comparison, appear to stay in one area even as the numbers of prey diminish, and in some cases can eat the population to local extinction.

Favored fare

Another study conducted by Oregon State University and Simon Fraser University showed that although lionfish have a voracious appetite and will eat almost any fish smaller than they are, they do have their favorites. They find it easier to stalk and attack solitary fish, rather than those in schools.

They like to hunt at dusk, near the bottom, and for some reason tend to avoid fish that clean off

PETER SYMES

Lionfish

parasites from other fish species that are common in a marine environment. "Fish that clean parasites off of other fish appear to be avoided by lionfish," said Stephanie Green, a research fellow at OSU. "Those that don't will be much harder hit."

Very reproductive

The broad dispersal of red lionfish may in part also be due to their reproductive habits. Females can spawn up to once every four days, which could result in one female releasing up to two million eggs a year. Following spawning, larvae can disperse long distances via ocean currents, for up to 35 days.

Control

An international research team led by researchers at the University of North Carolina at Chapel Hill looked at whether native reef predators, such as sharks and groupers, could help control the population growth of red lionfish in the Caribbean, either by eating them or out-competing them for prey. They also wanted to evaluate scientifically whether, as some speculate, that overfishing of reef predators had allowed the lionfish population to grow unchecked.

However, after surveying 71 reefs in three different regions of the Caribbean over three years, their results indicate there is no relationship between the density of lionfish and that of native predators, suggesting that, "interactions with native predators do not influence" the number of lionfish in those areas.

Culls by humans

The researchers did find that lionfish populations were lower in protected reefs, attributing that to targeted removal by reef managers rather than consumption by large fishes in the protected areas. It was noted that during 2013 reef surveys, there appeared to be fewer lionfish on popular dive sites in Belize, where divers and reef managers remove lionfish daily.

In the Florida Keys, Dr Pam Schofield, a biologist with the USGS Southeast Ecological Science Center, and her team are working closely with partners from the National Oceanographic and Atmospheric Administration (NOAA) and the Reef Environmental Education Foundation (REEF) in Key Largo, Florida, to analyze lionfish diets—an important first step in understanding their impact on reef ecosystems.

According to Schofield, eradication of lionfishes is probably not possible. Yet, local control efforts may be able to suppress the population, releasing pressure on the native ecosystem. Many Caribbean countries such as Bermuda and the Cayman Islands have begun lionfish control programs. In the US, REEF held a series of lionfish derbies in the Florida Keys that resulted in more than 600 lionfishes being removed from the Florida Keys National Marine Sanctuary.

Limits

While temporary localized eradication on very small reef sites can be achieved through continuous culling by divers, one mUst realise that this is the limit of what can be done, and the instant such culling ceases the lionfish will return. This temporary "weeding of the garden" in the middle of a prairie full of weeds is no solution, nor are fish traps and other removal schemes put forth by the several NGOs who are constantly on the lookout for grant money.

If there is a solution to the lionfish invasion—and that's a big *if*—it will be found in the laboratory, not at the end of a spear. Until then, we will have to wait (which be a long one) and trust that Mother Nature will sort this out through a disease or new predator or parasite that attacks lionfish, bringing their numbers down under a more harmonious level. Until then, our own efforts are no more effective than trying to eradicate flies at the local dump with a fly swatter. Anybody else that does not see it that way is either very naive or just kidding themselves.

Researchers from OSU also support restoration of large reef predators as a way to achieve better balance and biodiversity, but they are not optimistic that this would affect the burgeoning lionfish population. The scientists are also working with the International Union for Conservation of Nature to help identify some of the species and problem areas most at risk of extinction from the lionfish invasion, and where control of the invaders should be prioritized.

Multiple introductions

No one knows for sure exactly how the predecessors of the current population first made it into the Atlantic and Caribbean, but It is commonly believed that the lionfish invasion started in one location: An oft-cited legend has it that in 1992, Hurricane Andrew destroyed an aquarium in southern Florida, releasing six lionfish into Biscayne Bay. However, a lionfish was discovered off the coast off Dania Beach, in South Florida, as early as 1985—much prior to Hurricane Andrew. The lionfish resemble those of the Philippines, implicating the aquarium trade.

Newer research supports the notion that multiple introductions occurred, with some potentially coming from the more southern parts of the Caribbean Basin, which stretches from parts of Florida's Gulf Coast through South America. USGS researchers analyzed red lionfish samples from 14 countries and territories in the Greater Caribbean and Western Atlantic in an effort to better understand the invasive species' population structure and dispersal patterns. While red lionfish can be found in the Gulf, this study did not include any samples from that region.

Continuing research

Genetically unraveling the progression of the red lionfish invasion and determining if introductions are still occurring could help guide response and control efforts for this and other invasive fishes.

Researchers found that unique regional genetic patterns separated the studied area into northern and southern regions, with the split occurring near the Bahamas. It was these regional genetic differences that indicated multiple introductions. One rare genetic strain was found in only a few samples in the southern region, but was pervasive in the north.

Continued releases would increase the potential for more genetically diverse red lionfish to join the current population, which could counter future removal efforts or allow them to more rapidly expand their range beyond current boundaries. ■

AUGUST LINNMAN CC BY-SA 2.0

(File photo)
"We're back!"
—Atlantic cod
(*Gadus morhua*)

North Sea fish stocks rising

Thanks to management measures, key fish stocks in the North Sea—like cod, haddock and plaice—are rising and could result in significantly higher quotas next year, according to new scientific assessments.

Many years of restraint and restrictive fishing quotas seem to finally have paid off. Within a decade the stocks of spawning cod has almost doubled.

Though levels of cod in the North Sea are not yet what they were pre-crisis, a remarkable recovery is well under way and advancing. Along with cod and plaice, stocks of herring, haddock, hake, Norway lobster, common dab and witch (Torbay sole) are also improving.

Back from the brink

After the Second World War there were four million tons of cod in the seas closest to British shores. In the 1970s, the annual catch was between 200,000 and 300,000 tons, and by 1983, the cod population sank to its lowest ever level: an estimated 740,000 tons.

Quotas on catches were introduced in the 1980s and in 2004, with concerns about stock depletion still high, the permitted catch was set at 27,300 tons. In 2006, the stock of spawning cod stood at 44,000 tons. Today, it is 149,000 tons.

The overall picture is now sufficiently encouraging for the Marine Conservation Society to review North Sea cod's "fish to avoid" status, and it could be officially certified as "sustainable" by the Marine Stewardship Council within five years. Stock recovery is also being held back by the effects of climate change. The North Sea has been warming up—the temperature has risen by 1° to 2°C during the past 100 years—so cod and other similar whitefish species are moving north to colder waters. ■

Suez Canal expansion leaves Mediterranean wide open for invasive species

The continuing expansion of the Suez canal risks causing serious harm to ecosystems and economic activity in the Mediterranean Sea.

Earlier this month and amid much fanfare, Egypt unveiled a major expansion of the canal, which links the Red Sea to the Mediterranean, allowing vessels to avoid having to sail all the way around Africa. Having no locks, the canal is, however, also a shortcut for invasive marine species.

The Suez Canal once had a natural barrier within the passageway—the so-called Bitter Lakes, with waters so salty, they hindered the passage of sea creatures. But over a century of canal development, the lakes have lost their effectiveness. There are now about 700 non-indigenous species (NIS) in the Mediterranean, according to the scientists, about 350 of which have entered from the Suez Canal since its 1869 inauguration

Jellyfish swarms

This summer swarms of nomad jellyfish (*Rhopilema nomadica*)—a species indigenous to tropical warm waters of Indian and Pacific Oceans—invaded the shores of Israel and the eastern Mediterranean earlier this summer, sending bathers scrambling out of the water. The unwelcome visitors were gone within a few weeks, but the occurence are a symptom of a much bigger problem.

"The enlargement of the canal will increase the number of invasions from the Red Sea resulting in a diverse range of harmful effects on the ecosystem structure and functioning of the whole Mediterranean Sea, with implications to services it provides for humans," Bella Galil, a marine biologist at Israel's National Institute of Oceanography, told the *Guardian*.

Adverse effects

Most of the NIS introduced via the Suez Canal have established thriving populations along the Levant, from Libya to Greece, and several spread in the Western Mediterranean. The individual and cumulative impacts of these NIS adversely affect the conservation status of particular species and critical habitats, as well as the structure and function of ecosystems and the availability of natural resources. Some species are noxious, poisonous, or venomous and pose clear threats to human health.

Among the most destructive recent entrants from the Suez is the silver-cheeked pufferfish, a non-native fish containing toxic chemicals that has caused several people to be treated in hospital in the eastern Mediterranean in the past 10 years. Two kinds of herbivorous rabbit-fish—the dusty spine-foot and its cousin the marbled spine-foot—have destroyed vast swaths of underwater seaweed forests in the eastern Mediterranean, after migrating through the Suez in recent decades. ■ SOURCE: BIOLOGICAL INVASIONS

RATHA GRIMES / WIKIMEDIA COMMONS / CC BY 2.0

Dusky spinefoot (*Siganus luridus*) in the Mediterranean Sea

wreck rap

World War II Wreck

SS Seniority

— Off Scotland's West Coast

Text and photos by Lawson Wood

One of the best shipwrecks off the west coast of Scotland, the SS *Seniority*, has a tale to tell from her days as an Empire ship built during WWII in Great Britain.

During World War II, a number of merchant ships were drafted into the military service by the British government, specifically, the Ministry of War Transport (MoWT). They were allocated to serve various shipping companies that were involved in the war effort. This range of ships was prefixed by the name 'Empire'. One such ship was the *Empire Boswell*, a 2,876 GRT cargo ship built in 1942.

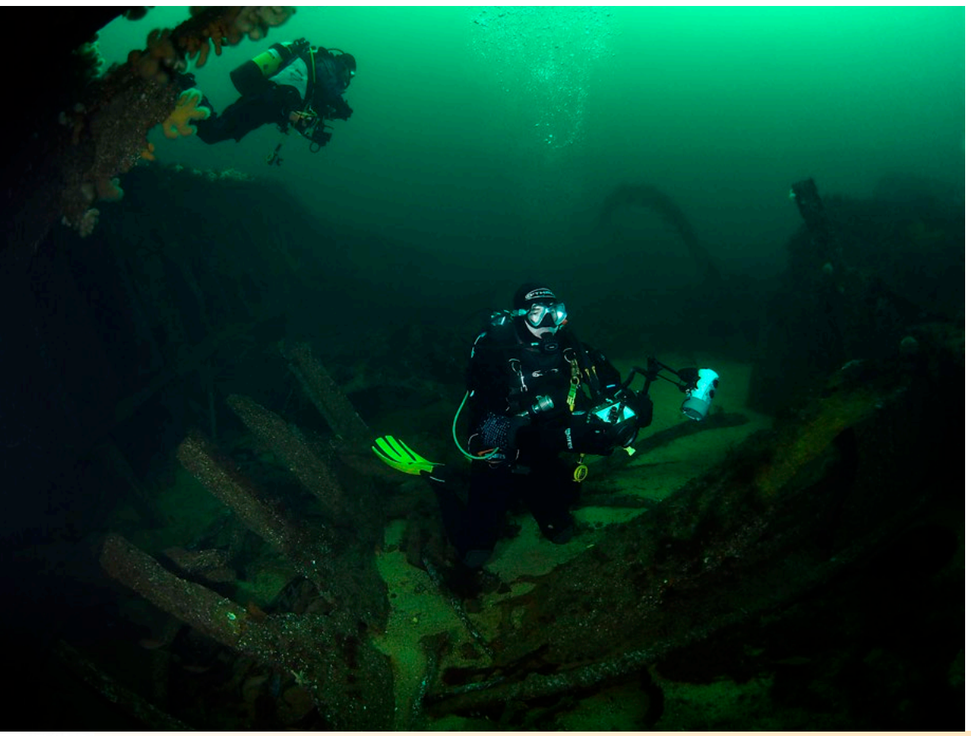
With a length of 96.11m, the *Empire Boswell* was fitted with a triple expansion steam engine. It was designed as a Scandinavian-type cargo ship of the three-island class, which meant that the cargo handling was grouped around the three 'islands' of the ship—the stern, bow and amidships. [There is some discrepancy over her yard works number as some sources have it listed as #738 and Wikipedia has it as #1135].

The ship was 96.11m (315ft, 4in) long. She had a beam of 14.15m (46ft, 5in) and a depth of 7.01m (23ft). The vessel had a triple expansion steam engine with cylinders of 51cm (20in); 86cm (34in) and 140cm (55in) bore by 99cm (39in) stroke. This engine was built by the Central Marine Engine Works, also from West Hartlepool. The ship's official UK registration number is 168945.

Empire Boswell had a successful career under the MoWT where she was operated by the Currie Line Ltd until 1945 and then the British India Steam Navigation Company until 1947, when she was sold into the Merchant services to the Aviation and Shipping Company Ltd and changed her name to the SS *Aviswell*. Here she was operated by the Purvis Shipping Company Ltd until 1949 when she was sold to FT Everard until her demise under her new name the SS *Seniority*.

During WWII, *Seniority* was placed in a number of successful convoys, although

THIS PAGE: Scenes from the dive on SS *Seniority*

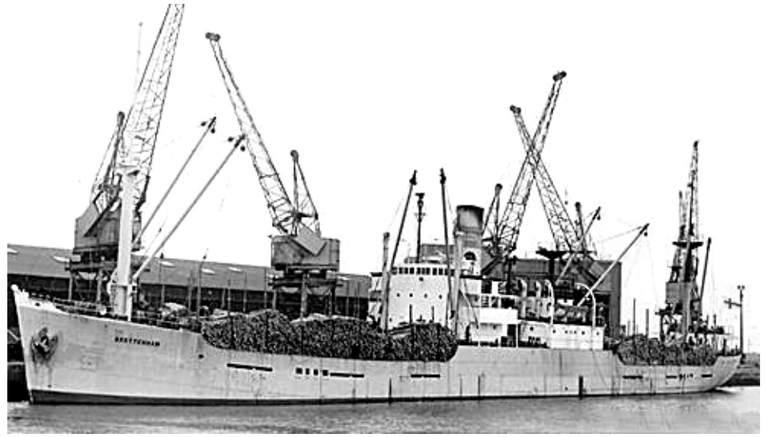


she was noted as a 'straggler' on her way to Canada in Convoy 160 in 1943. She came back to the United Kingdom in convoy SC129 from Halifax, Nova Scotia and only took her 19 days to reach Liverpool. In convoy UGS18, she had quite a trip leaving Hampton Roads in the United States and travelled directly to Port Said in in October 1943 at the height of the war and then joined the convoy from Gibraltar to Algeria.

Whilst travelling to Ellesmere Port in ballast, the steamship *Seniority* ran aground on 7 November 1950 at Leinish Point in the Outer Hebrides, and although she was refloated, she foundered once more off Bo Vich Chuan Rock off the south-east coast of Barra and sank on 8 November 1950.

The *Glasgow Herald* on Thursday 9 November 1950 recorded the event:

"The crew of the London steamer *Seniority,* which was wrecked off the coast of Barra, Outer Hebrides late on Tuesday night during a gale, have been landed at Castlebay, Barra,



Historical photo of the SS *Seniority*

THIS PAGE: Scenes from the wreck of the steamship *Seniority*

by Castlebay lifeboat. A message recovered by Lloyds late yesterday stated that the vessel was aground on the rocks. Her pumps had broken down and she was settling well on her stern. Her afterdeck was fully awash. The situation, it was stated, was serious. It was reported later from Duntulm lifeboat station, Skye, that the crew of 30 had been taken off by the lifeboat. The steamer was wrecked on the rocky east coast of the island, three miles northeast of Castlebay at a spot where a Greek and Canadian ship ran ashore within 24 hours of each other during the Second World War."

The *Oban Times* on the same day had the following information:

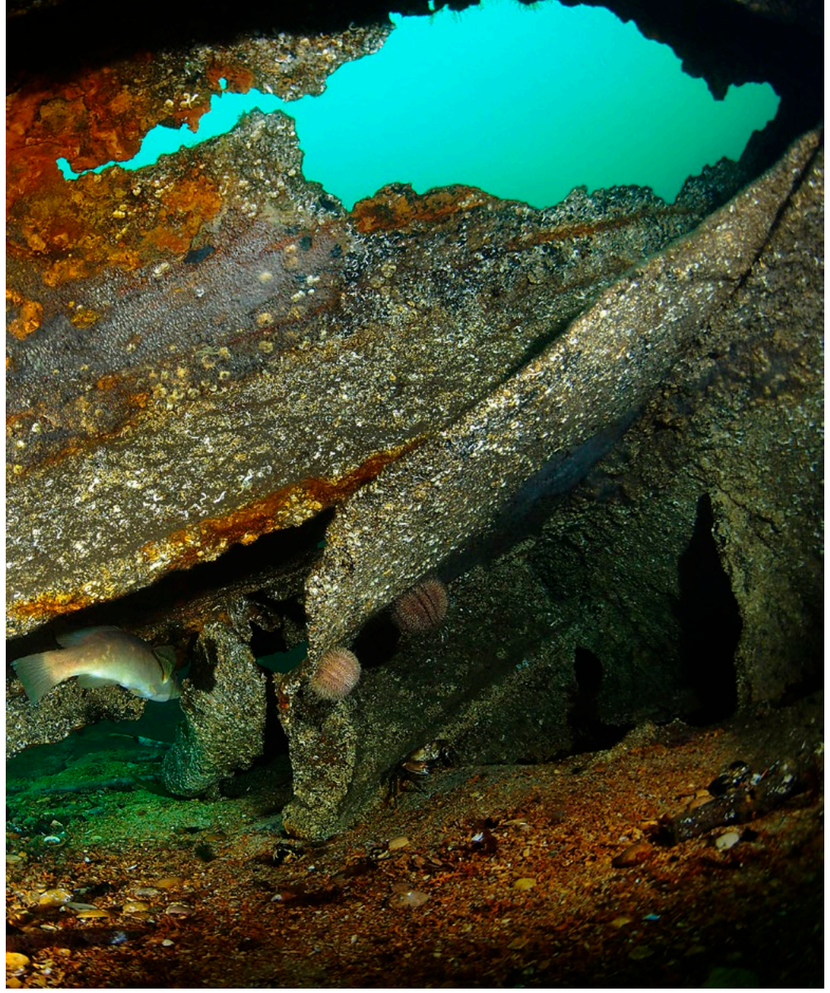
"Stranded Ship Sinks off Barra: During gales early on Thursday, the 2895-ton London cargo steamer *Seniority*, which went ashore off Barra on Tuesday night, disappeared in 10 fathoms of water. The Master of the *Seniority*, Captain I. Anderson, North Shields, who, with his crew of 30 were taken off by the Barra lifeboat and given shelter at Castlebay, intended to return to his ship on Thursday when it was expected that tugs would try to refloat her."

Finally, *Seniority's* fate was recorded in the *Glasgow Herald* on November 9:

"The London cargo steamer *Seniority*, which was wrecked on rocks off Barra, Outer Hebrides,

wreck rap

Scene from the wreck of the steamship *Seniority*



on Tuesday night, sank in about 10 fathoms early yesterday during a gale. The vessel's captain and her crew of 30 were rescued by Castlebay, Barra, lifeboat on Wednesday."

Clearly here, the crew were unable to get back to the ship; she was gone—for now.

Diving the wreck

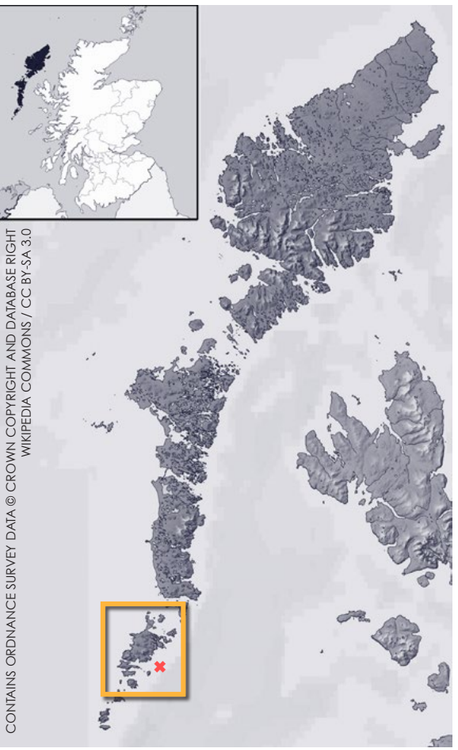
It was whilst exploring the Outer and Inner Hebrides on the *Elizabeth G* in September 2014 that Rob Barlow, the owner and skipper of the liveaboard suggested that we may "quite like" the dive on the steamship *Seniority*. Knowing how avid a photographer I am and my interest in shipwrecks, this seemed like a perfect opportunity to dive a relatively undived wreck in calm, sheltered waters.

Overnighting in a bay off the south coast of Barra, near Castlebay, we discussed the forthcoming dive, but there was very little information available on the wreck, other than that she was in 18- 21m (60-70ft) of water, with normally good visibility, and that the ship wreckage was well strewn out over the seabed.

There's not too much planning involved in this dive—just jump in with your buddy, swim down the shotline and explore the shipwreck until it was time to come up—perfect!

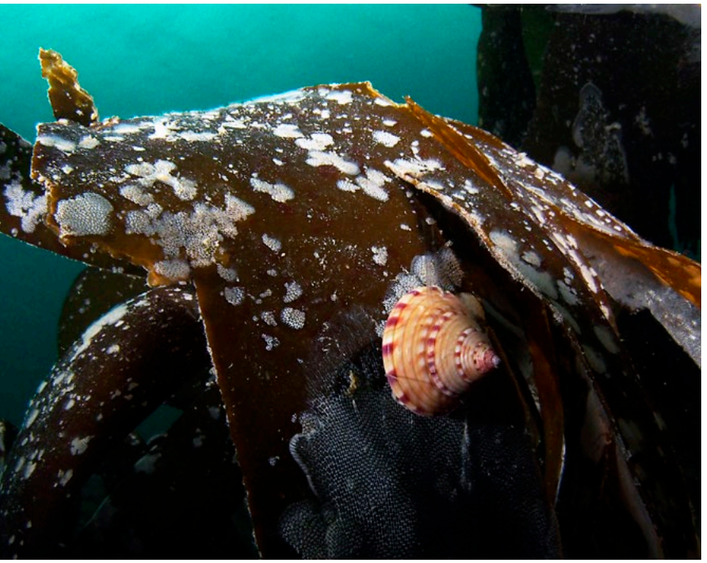
On entering the water for the first dive on the wreck, we were immediately struck by the great visibility encountered here, and even on the surface, we could see the ship quite clearly on the seabed. To our right (east) was the bows, which were lying over to the starboard side and deeply embedded in the sand and shell seabed. Just back from the bows were the start of the winching gears, anchor chain locker and forward mast. The forward hold was exposed and easily accessible.

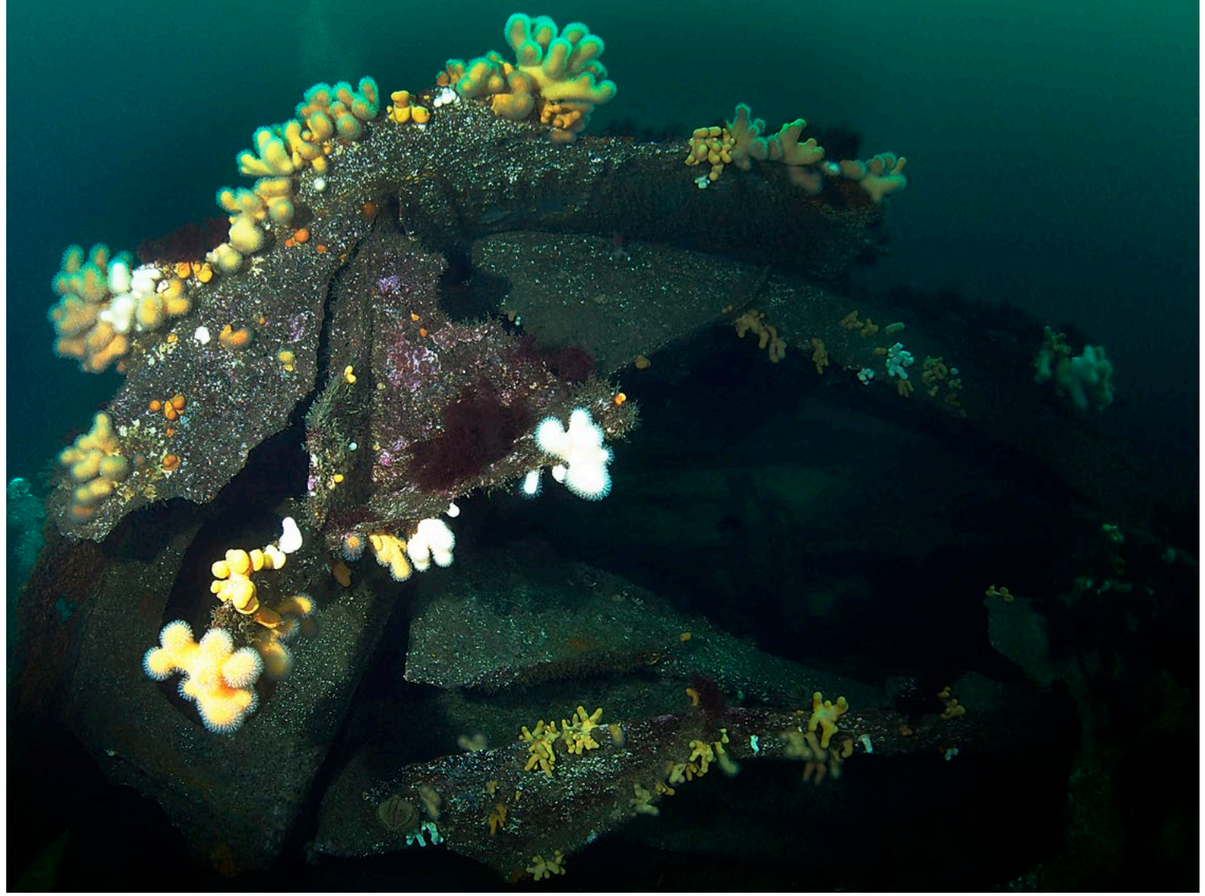
Directly under us were a series



Location of Barra and *Seniority* wreck, Outer Hebrides, Western Isles, Scotland

THIS PAGE: Marine life thrives on and around the wreck of the steamship *Seniority* including dead man's fingers (right), painted topshells on fronds of kelp (below), ling, cod and wrasse





of flat plates, which looked like they may have interesting nooks and crannies, and to our left (west) and ahead (north) the remainder of the ship's upturned hull could be seen.

This is a large shipwreck, and unsurprisingly, has suffered over the years. Many of her ribs are exposed, but there are large sections of upturned hull that allow you access into a calm interior, with the metal parts simply covered in sea squirts.

The rear parts of the hull are completely laid open, and the propeller has been removed—or certainly not found on the two dives we did on the ship. The large triple-expansion boiler was very evident sitting amidst the wreckage, with the quite large 'donkey' boiler sitting next to it.

Marine life

With such clear water, there was good kelp growth on much of the superstructure, and the entire area was a haven for fish life. Predominant fish were several ling, cuckoo wrasse, ballan wrasse,

CLOCKWSIE FROM RIGHT: Common lobster; Dahlia sea anemone; Flounder; Feather star

poor cod and thousands of sprats of unknown species of white fish. The seabed had large dahlia anemones, plenty of starfish and shell debris from scallops, queen scallops and mussels. This is quite clearly a very productive site with a high yield of marine life.

With my dive buddy, Phil Sturdy, we first explored the bows and winch gears and followed our route around the first hold and were amazed at the number of ling that were swimming about in the open; cuckoo wrasse were everywhere, particularly the males, sporting the incredibly colourful blue markings on the head and tails. Under the exposed hold sections, poor cod, ballan wrasse and tons of whitebait were all over the place. The plates of steel on the seabed had ling hiding underneath and the seabed was dotted with anemones, large starfish, scallops, and even small seapens.

Big hermit crabs, razor clams and burrowing anemones were dotted around the wreckage, and inevitably, we were drawn towards the larger ship parts. The stern was fairly far to the north, and although we were unable to find her propeller, the drive shaft and gearing mechanisms for the engine room were very evident. The larger hull parts had pincushion starfish (*Porania pulvillus*) and most of the covering kelp had painted topshells (*Calliostoma zizyphinum*) and several species of nudibranch.

Soon enough, time was over on the ship's exploration and we returned to the *Elizabeth G*, happy and satisfied after diving on one of the best shipwrecks off the west coast of Scotland. ■

SOURCES: PLIMSOLL SHIP DATA, WIKIPEDIA

Lawson Wood is a widely published underwater photographer and author of many dive guides and books. For more information, visit: ***www.lawson-wood.com****.*

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Eight escudos gold coins with profile of Philip V of Spain, dated 1730

Divers find $4.5 million in 18th century gold coins off Florida

Around 350 gold coins were recovered 300 years to the day after 11 Spanish ships sank in a hurricane off the coast of the US state of Florida at Sebastian. A salvage company, 1715 Fleet Queens, led by CEO Brent Brisben, owns the rights to the 1715 Fleet shipwreck site.

Brisben said, "These shipwrecks were pushed by the hurricane into the outer edge of the reef and then they were utterly destroyed by the wave action, so pieces of these ships have floated for miles all the way into the beach up into the dunes."

Diver William Bartlett, who was the first person to stumble upon the gold in just in just 2m (6ft) of water, was on his third dive on the shipwreck site, along with Brisben and Jonah Martinez, when he made the discovery on July 30.

Nine of the gold coins are very rare Royals. Valued at US$300,000 each, these coins were made for the King of Spain in the 18th century. Bartlett told reporters, "They were specifically made for King Philip V, incredibly rare, only 20 known to exist before we found these nine."

Brisben said not since 1998 have artifacts such as these been found. "These Royals are perfect specimens of coinage of the time and they were made on royal order for the king of Spain to be mostly given out as [a] presentation piece."

Twenty percent of the find will go to the State of Florida to be displayed in a museum for public viewing. ■

SOURCES: CATHOLIC.ORG, THEGUARDIAN.COM, WILX.COM

Finders of SS *Central America* cannot keep gold hoard

Federal judge in the US state of Virginia has ruled that the explorers cannot cite "finders keepers" as justification for claiming that treasure as their own.

SS *Central America*, known as the Ship of Gold, was a 280-foot (85m) sidewheel steamer that sank in a hurricane off the coast of the Carolinas in September 1857, along with more than 420 passengers and crew and 14 tonnes of gold with an estimated value of US$300 million on today's market.

With so much money on the line, ownership of the loot has been entrenched in legal battles ever since its discovery by Columbus-America Discovery Group in 1989.

In 1990, a Virginia federal court awarded 90 percent of the gold to salvor-in-possession, Columbus-America Discovery Group, with the remaining 10 percent to be divided among insurance underwriters. Significant amounts of gold and artifacts were recovered and brought to the surface. Thirty-nine insurance companies filed suit, claiming that because they paid damages in the 19th century for the lost gold, they had the right to it.

The team that found it argued that the gold had been abandoned. After a legal battle, 92 percent of the gold was awarded to the discovery team in 1996.

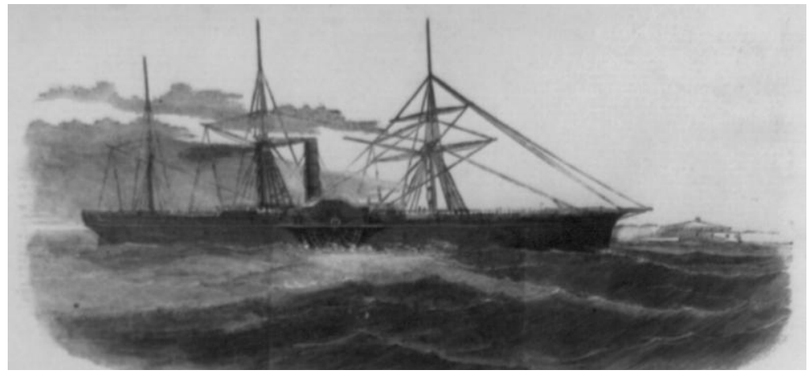
In March 2014, Recovery Limited hired the Odyssey Marine Exploration group to conduct further archeological recovery and conservation of the remaining shipwreck. Those operations managed to find and recover gold and artifacts which had initially gone overlooked, including an 80-pound gold ingot that sold for $8 million.

Denied title

But US District Judge Rebecca Beach Smith on August 11 denied Recovery Limited title to the wreck, finding that salvage rights preclude the maritime law of finds, which was intended for naturally occurring valuables, such as ambergris and whales.

"A free finders-keepers policy is but a short step from active piracy and pillaging," Smith wrote. "Were this court to allow Recovery Limited Partnership, the current salvor-in-possession, to enjoy immediate title to the artifacts it has recovered since early 2014, then the court would risk an 'unsupervised rush to the site to recover anything that could be grabbed.' The public interest in historic shipwrecks would be diminished, if such an 'unsupervised rush' to sunken treasure were to result." ■

SOURCE: LAW.JUSTIA.COM



SS *Central America* sank in a hurricane in September 1857.

Bell from WWII battleship HMS *Hood* recovered

On 7 August, 2015, a research team led by US philanthropist and entrepreneur Paul G. Allen successfully recovered the bell of the battlecruiser HMS *Hood*, which sunk in 1941 during World War II.

The bell was successfully recovered the 7 August. Allen's team led the operation using his yacht MY *Octopus*, which is equipped with a state-of-the-art remotely operated vehicle (ROV). Once restored, the bell will respectfully serve as a tangible and fitting memorial for the 1,415 lives lost when the *Bismarck* sunk the ship in the North Atlantic.

The bell was first discovered and photographed in July 2001. The bell was found lying on the seabed well away from the parts of the battlecruiser's hull. A 2012 Allen-led expedition to recover the bell was hampered by prevailing weather conditions and technical difficulties. The bell is in good condition but will require a year-long expert conservation and restoration effort because it has spent so long in deep seawater.

Sunk by *Bismarck*

HMS *Hood* is the largest Royal Navy vessel to have been sunk, causing the largest loss of life suffered by any single British warship and the recovery is fully supported by the HMS *Hood* Association whose members include veterans who served in the ship before her final mission in 1941, and relatives of those lost with her.

In May 1941, she and the battleship *Prince of Wales* were ordered to intercept the German battleship *Bismarck* and the heavy cruiser *Prinz Eugen*, which were en route to the Atlantic where they were to attack convoys. On 24 May 1941, early in the Battle of the Denmark Strait, *Hood* was struck by several German shells, exploded and sank. ■

SOURCE:: PR NEWSWIRE

ALLAN C. GREEN & ADAM CUERDEN / WIKIMEDIA COMMONS / PUBLIC DOMAIN

HMS *Hood* was the last battlecruiser built for the Royal Navy.

Considering it sank more than 500 years ago, the wreck is still in good condition.

Sea monster figurehead from a 15th century Danish warship wreck salvaged

The *Gribshunden* (*Griffin*) is thought to be the world's best-preserved, late Medieval Age ship. *Gribshunden* was a Danish warship and the flagship of King John of Denmark, who ruled in 1481–1513. *Gribshunden* sank in 1495 in the Blekinge archipelago (in southern Sweden) after catching fire off the coast of Ronneby.

"It's a sea monster—and we have to discuss what kind of animal it is," said Johan Ronnby, professor of marine archaeology.

"I think it's some kind of fantasy animal—a dragon with lion ears and a crocodile-like mouth. And there seems to be something in his mouth. There seems to be a person in its mouth and he's eating somebody," he added.

The wreck was first found by sportsdivers in the 1970s, but unaware of the identity and significance of the wreck, it was not until much later, in 2000, that archaeologists learned about the discovery. In 2013, archaeologists identified the ship as the *Gribshunden*. The wooden ship is in remarkably good condition, left relatively free of sea worm damage and is among the best-preserved ships from the early modern period. ■

SOURCE: BLEKINGE MUSEUM

Figurehead from the wreck of 15th century Danish warship *Gribshunden* was carefully lifted from the seabed.

National Historic Site in Nunavut for Franklin wrecks

Adding the wrecks of the HMS *Erebus* and HMS *Terror* to the National Historic Sites of Canada list provides the site with the protections afforded by the Canada National Parks Act and its regulations.

Parks Canada plans to create a new National Historic Site around the wrecks of HMS *Erebrus* and HMS *Terror*. On April 8, the Canadian government amended the National Historic Sites of Canada, registering the 10km by 10km area around the place where Franklin's ships are both thought to have sunk.

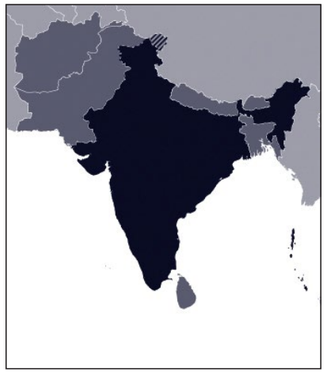
"The story of John Franklin has captured the imagination of Canadians and the HMS *Erebus* shipwreck is regarded as significant to the story of Canada. There is therefore a cultural benefit to Canada from protecting this important national historical site and its artifacts," said the agency in a statement.

Fines up to $100,000.

The order will provide the federal government with the authority to prevent unauthorized access to protect the site of the shipwreck, the shipwreck itself and its artifacts, as cultural and historical resources, and to allow for the application of enforcement powers, offences and penalties under the act. This includes fines of up to CA$100,000.

A management plan will be completed within five years. Summer dive operations involve both scuba-diving and surface-supplied diving from small vessels anchored to blocks carefully placed around the site. ■

travel news



Booking portals in hot water as Germany rejects hotel rate practices

Antitrust regulators in Germany warned the Priceline Group Inc.'s Booking.com that they are most likely going to ban the best-price deals the online reservation site has with hotels.

In the provision of the narrow rate parity proposed by Booking.com, a hotel has to give Booking.com the same or better room rates than the hotel gives to customers directly through its own website.

Reservation sites such as Booking.com and Expedia Inc. continue to use the rate parity clauses even though the Federal Cartel Office in Germany ordered another online travel operation in 2013 not to bar hotels from offering better prices directly to customers or to competitors, according to a recent statement by Bundeskartellamt regulators.

"The Bundeskartellamt intends to forbid Booking.com, by far the largest hotel portal in Germany, from further use of the best-prices clauses," said regulators in the statement. "The ongoing procedure against Expedia continues." ■

SOURCE: SKIFT.COM

App to the rescue of the jet lag prone

IATA launches SkyZen app to improve travel experiences and help manage jetlag.

The International Air Transport Association (IATA) has released details of a new mobile app for passengers to monitor their health and wellbeing before, during and after a flight. Used in conjunction with a "Jawbone" fitness wristband, the SkyZen app enables air travelers to view their activity and sleep patterns throughout the whole flight experience. Helpful hints will enable users to improve their travel experience and combat jet lag when crossing time zones. SkyZen is free to download and use from the Apple iTunes store, and works with the Jawbone health tracker. The Apple Watch and Fitbit version will be released shortly. Users of the app only need to enter their flight number, date and class of travel, and SkyZen will automatically collect and aggregate the data. Using the data collected, SkyZen will offer passengers personalized insights on their flight activity and strategies to minimize jet lag before and after flight. ■

JAWBONE.COM

Quicker, easier e-visa for India

Save both time and money with India's new online visa application.

India wants to encourage tourism, so it has overhauled what has long been a laborious and expensive application process and replaced it with a new online application. In addition, 36 new countries have been added to its new e-visa program, including the United States, United Kingdom and Australia.

The e-Tourist Visa (eTV), which costs US$60 (GB£39) plus a small administration fee, is now a fully online application, approval of which takes five to six working days. Travellers will now be able to upload their documents, make payment and track their application through the website. Approved applications allows travellers to enter the country in the month after the date of visa issue and stay for up to one month in India. It cannot be extended, but can be used two times a year.

Travellers are warned to be aware that there are unofficial visa websites that try to take advantage of the new e-visa process. Get your visa throught the official eTV website only or though a reputable visa company. ■ SOURCE: WANDERLUST.CO.UK

For more information, visit the official website at: ***https://indianvisaonline.gov.in/visa/tvoa.html***

In protest: Air travellers not showing boarding passes at airport stores

Did you know that there's no law saying you have to show your boarding pass at airport shops? Were you aware that the shops make customers do this so they can rake in millions in profits from the discounts?

Mounting anger about the tax sham exposed in the British newspaper, the *Independent*, on August 8 has resulted in air travellers refusing to show their boarding passes to store cashiers in airports. It has been revealed that the information from travellers' boarding passes is being used by these stores to avoid paying the 20 percent VAT, however, the stores do not pass on the discount to the customer—so essentially the shops are pocketing millions from duty-free sales discounts.

It was assumed by passengers that they were legally obligated to show their boarding passes when purchasing goods in airport stores. Shock and dismay has been expressed at the revelation that retailers were inconveniencing customers in order to hike up profits.

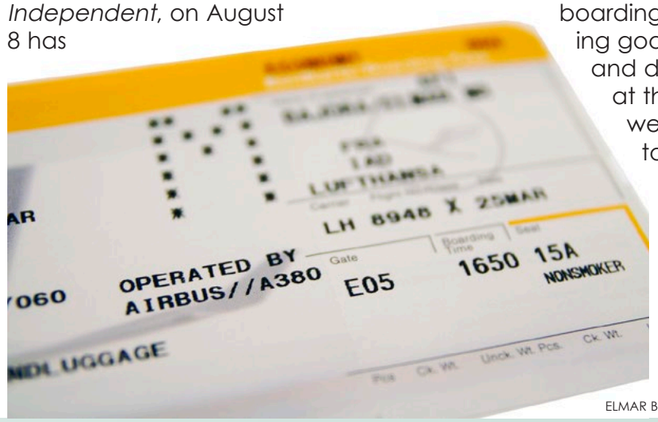
Since the story came out, there have already been reports of travellers protesting the VAT rip-off at Heathrow airport shops such as Boots and WHSmith. Consumer protection organizations have backed the campaign put forward by the *Independent* to end the VAT scam.

"People withholding their boarding passes will force companies to take note and eventually take action," said Martin Lewis of MoneySavingExpert.

Money website SavvyWoman's Sarah Pennells said: "If airport shops aren't going to pass on the VAT saving, we should refuse to show our boarding cards. Shops aren't being transparent. If they are not paying VAT on purchases made by passengers leaving the EU, they should be passing those savings on."

The Green Party's local transport spokeswoman, Caroline Russell, said: "It is wrong that airport shops, predominantly multimillion pound operations, continue to reclaim VAT without reducing prices for customers."

However, retailers contend that it would be a "practical impossibility" to have a dual pricing system, and there is no indication that store chains are acting contrary to law. ■ SOURCE: INDEPENDENT.CO.UK



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Florida's

Palm Beaches

— Home of Surprising Diversity

Text and photos by Walt Stearns

Schools of porkfish and grunts

When divers look to the horizon for destinations offering marine life of the large variety, they often look to such corners of the world like the Galapagos or Coco Island, Isla Mujeres, Silver Banks, Tonga, Bahamas Tiger Beach or Raja Ampat, to name a few. While not as exotic in name, one particular stretch of the US state of Florida's southeast coast called the Palm Beaches is rapidly gaining recognition as a place to experience large animal encounters.

It's a funny thing about describing a dive destination you have visited versus one you dive all the time. The difficulty for me, is knowing where to begin when attempting to explain what there is to see here by my home in Palm Beach, Florida, to anyone who has never experienced it.

What I often get hit with is, "Oh yeah, you do a lot of drift

Spotfin hogfish (above). PREVIOUS PAGE: Governor's River Walk Reef

Tiger shark

Goliath grouper (above); Hammerhead shark (top right); Eagle ray (right inset)

Green sea turtle

diving there." While the technique of drift diving is certainly the means which area reefs and wrecks are explored, it is not by any means the main reason to dive here.

What makes the Palm Beaches area so compelling is the marine life. I am not talking about profusions of pretty little reef fish—although we have them here—I am talking about the wide cast of big-ticket show-offs that make the heart skip a beat when they suddenly appear. The list of heavy hitters that call the Palm Beaches home is both long and distinguished, from all five species of sea turtles native to the Atlantic to more than a dozen species of shark. Lemon, bull, reef, sandbar, silky, dusky, tiger and greater hammerhead sharks get top billing. And although rare, encounters with both whale sharks and great white sharks have taken place here. Then there is, of course, the big man on campus—the goliath grouper.

Diving with the ancient mariners

Seeing sea turtles during your dives is still as much a signature trait to diving the Palm Beaches as it was way back when diving first began here. Coming across two or more of these non-threating and often quite large marine reptiles was so frequent that if you had seen fewer than two during the course of a dive, then it was considered a really slow day. That is because this coastline is one of the few places where all five of the Atlantic sea turtle species—loggerhead, hawksbill, green, leatherback and Kemp's ridley—are known to converge.

So which sea turtle species are the ones you are most likely to see?

Kemp's ridley. The first species I will get out of the way is the Kemp's ridley sea turtle (*Lepidochelys kempii*), which is a rather small member of the sea turtle clan, measuring 90cm (36in) in length and averaging no more than 45kg (100 lbs) in weight. Due to their general appear-

Baby leather-back sea turtle

Florida

ance, they are easily mistaken for a young loggerhead. The most telltale feature to tell them apart is the carapace (shell) on a Kemp's ridley sea turtle is both slightly flatter and rounder.

Although found predominantly in the Gulf of Mexico, there is a small population of Kemp's ridley that live off Florida's eastern coast between Jacksonville and the northernmost end of the Palm Beaches in Jupiter. So far, I have come across three in all my years of diving off Jupiter.

Leatherback. Another rarity for divers is the giant leatherback (*Dermochelys coriacea*), a sea turtle which at full maturity can measure over 1.9m (6ft) in length and weigh up to 500kg (1,100 lbs). The largest leatherback recorded was 1.98m (6.5ft) in length and tipped the scales at 915kg (2,019 lbs), making it a colossus in the world of living sea turtles.

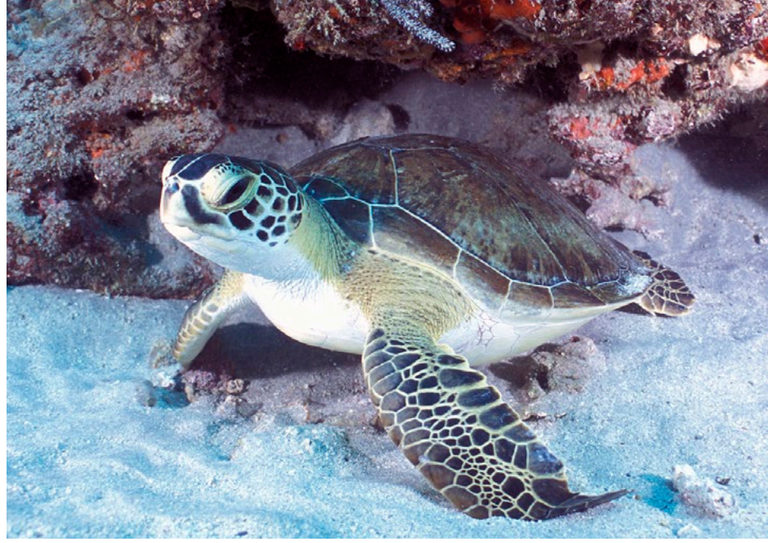
While in-water encounters with leatherbacks are fairly rare, meetings with this species do take place, and when they do, there is no mistaking this creature, which has a predominantly black body, with white markings and a teardrop-shaped leathery carapace instead of a hard shell. The answer as to when is the best time to look for leatherback sea turtles begins around early March, as this is the beginning of this sea turtle's nesting season, which typically ends in June.

The Palm Beaches area is a major breeding and nesting ground for not only the giant leatherback sea turtle but also two other primary species of the Atlantic—the green and loggerhead sea turtles. When nesting season reaches its peak in May and July, the south Florida coastline plays host to more sea turtles per acre than anywhere in the southeastern United States or the Caribbean.

According to the data compiled each year by the Loggerhead

Mating green sea turtles—during the height of breeding season, male greens can become so amorous, that they will at times pursue the wrong species, giving resident loggerheads and hawksbills a fit, while in the process providing a show for divers.

Loggerhead and green sea turtles (left); Hawksbill sea turtle (below); Green sea turtle (right); Mating loggerheads (lower left)



Marinelife Center, which records and monitors 9.5 miles of beach in northern Palm Beach County alone, researchers often see the number of sea turtle nests in excess of 10,000 per season.

So far, this season, 2015, is shaping up to be a banner year, with over 9,700 loggerhead nests, green sea turtle nests coming in at 3,616, followed by 213 leatherback nests, for the months of March through July alone. And the season is still not over.

Green. For the most part, green sea turtles (*Chelonia mydas*) are highly transient and only converge in numbers during their nesting season, which runs from May through September. Easily identified by their smooth, olive-brown carapace (shell) marked with darker streaks and/or spots, and equally smooth bullet-shaped head, green sea turtles are not only large, averaging 190kg (240 lbs), the males can get quite amorous. Oftentimes their quest to mate can get so heated that they will sometimes pursue the wrong species, giving resident loggerheads and hawksbill sea turtles a fit, while at the same time providing a show for divers.

Mating loggerheads—during mating season, the yearly ritual among adult male loggerheads can get very heated, as they jockey for a chance to mate with viable females. This can sometimes escalate into a fight between potential suitors.

Loggerhead. Since the loggerhead sea turtle (*Caretta caretta*) nesting season pretty much overlaps that of all the other species—beginning as early as March and ending as late as August—any time of year is good for seeing them. That is because there is a very large resident population of loggerheads here to begin with, a feature which has made them a signature attraction to Palm Beach diving.

When it comes to looks, these darlings of the reef may not win a beauty contest, between their thick, rough-textured shell and large, blunt head, which looks like the end of a log, hence the name—but they are impressive. Even next to a giant leatherback, they are the second largest turtle found here, with a carapace length around 1.2m (4ft). A fully mature female will average between 158-204kg (350-450 lbs) in weight.

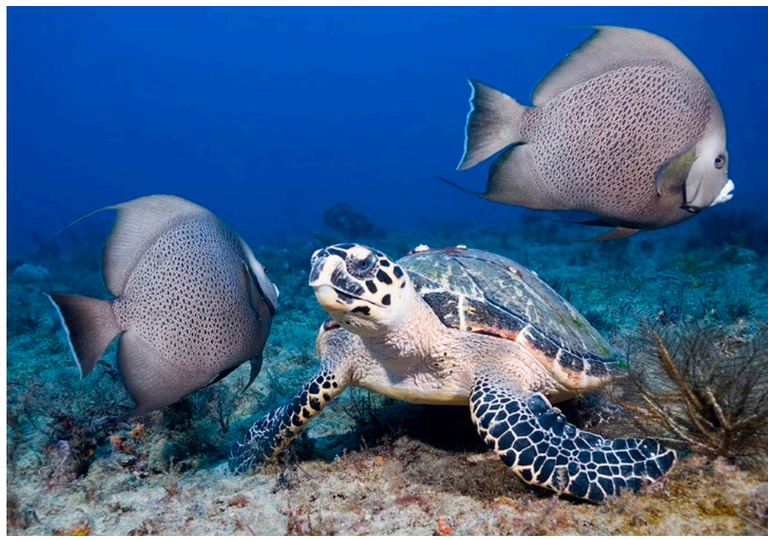
Diving the reefs in the 15 to 24m (50 to 80ft) range, like Breakers Reef straight offshore at Palm Beach Island during the height of nesting season (late May-June), it is not unheard of to count as many as 20 to 30 adult loggerheads scattered about the bottom during the course of one dive.

Most will be females, recovering from the physical expense of hauling their large bodies out of the water and up a sandy slope in the night to dig a hole deep enough to bury the 100-plus eggs they will lay, only to drag themselves back to the sea to repeat the ritual ten days later.

The most telling evidence of their fatigue is the fact that you will find most of these ol' girls so bugged out from exhaustion that they will barely make it to the reef before falling asleep in their tracks. Even more comical are the ones that make a poor attempt in parking their large bodies, like a large truck in a small tool shed, with only their heads concealed under small overhangs while the rest of their massive bodies remain exposed to the world.

Hawksbill. Another highly abundant species of sea turtles off the Palm Beach coastline is the Atlantic hawksbill (*Eretmochelys imbricata*). Next to loggerheads, hawksbill sea turtles are a smaller and more agile species, identifiable by the ornate coloration of their shells and protruding upper jaw, with strong resemblance to a hawk's beak.

Often, divers will come upon one using that specially-designed beak to dig into and tear small chunks from a sponge.



Hawksbill sea turtle with pair of angelfish

THIS PAGE: Atlantic reef sharks; Napping under overhang in reef (right)

Hawksbill sea turtles are basically spongivores, feeding on sponges as a primary part of their diet, which also explains why they are a common feature to Palm Beach reefs.

The one thing I find interesting is that unlike leatherbacks, greens and loggerheads, hawksbill sea turtles rarely nest here, as most of these turtles encountered are largely adolescent individuals, measuring less than 60cm (24in) in length. Once in a while I will come across a fully mature turtle in the 91cm (36in) range, weighing as much 86kg (190 lbs), but these I tend to write off as transient turtles just passing through.

Shark Alley

Seeing a large shark adds excitement to any dive, which is something the waters of Palm Beach feature. The most common members of "the guys in the grey suits" likely to be seen are comprised of nurse, Atlantic reef, lemon and bull—in that order.

Atlantic reef sharks. Several of the reefs up between Jupiter and North Palm Beach—like Shark Canyon and Tunnels—are regular stomping grounds for Atlantic reef sharks (*Carcharhinus perezii*). Dive charters do not feed these sharks, as it is not permissible in state waters. The sharks are at times inquisitive, granting a lucky photographer a good photo op now and then. One of the interesting behaviors I have seen these sharks do, from time to time, is taking naps beneath overhangs provided by the edge of the reef.

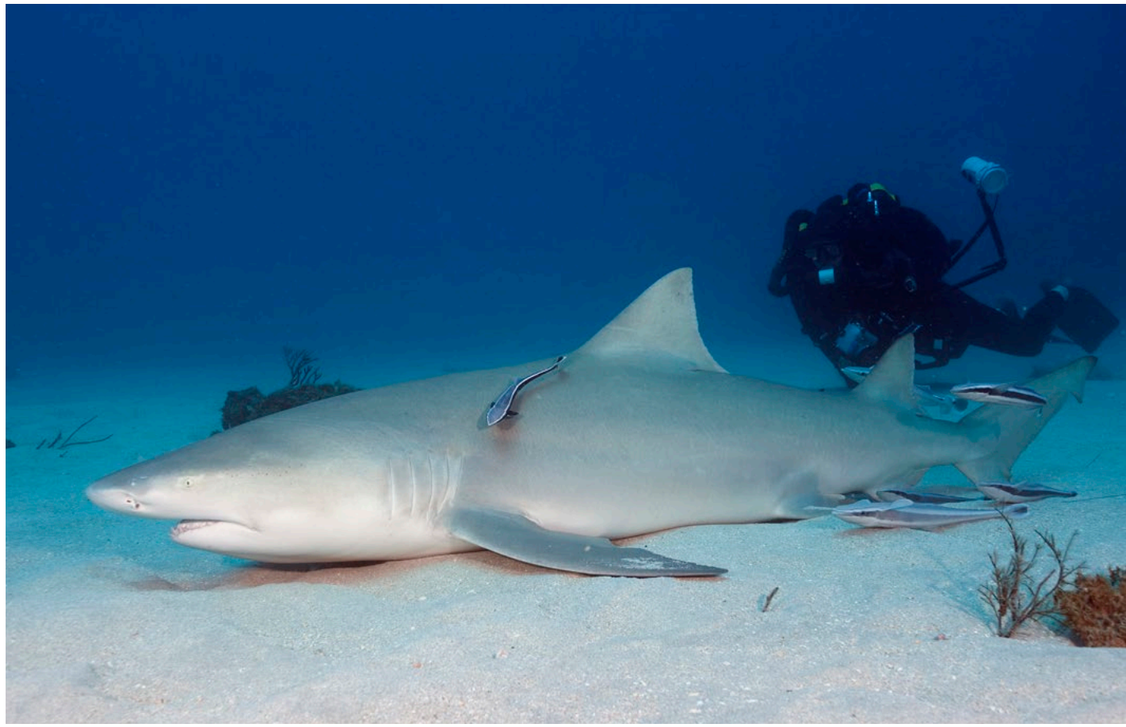
Lemon sharks. A personal favorite of mine is the lemon shark (*Negaprion brevirostris*), which also cruises the same primary reef system running parallel to the coast at depths between 14-18m (45-60ft) and 21-30m (70-100ft). Measuring up 2.4m (8ft) long, weighing as much as 136kg (300 lbs), these big brawny fellows (actually most are females) have all the baring and looks of a pretty serious customer. Yet, comparing them to a species like the Atlantic reef shark (the species common to most shark dives in the Bahamas) they are not highly excitable, but rather, they come across as better-behaved. Which is a good thing, because they are the least bashful about coming in real close to photographers.

I really got to know one particular shark back in January 2001 when I came upon something I had never seen before—over 40 of these sharks, all adult in size, resting on the bottom in formation like cars in a parking lot. Upon contacting Dr Samuel Gruber—one of the world's most renowned experts on lemon sharks—he confirmed that this particular aggregation behavior was one-of-kind, unknown to occur anywhere else in the world, setting into motion a highly extensive study under the auspices of Doc Gruber's Bimini Shark Lab. The information from the Jupiter Lemon Shark Project was able to fill in new chapters about this shark's natural history that were previously unknown.

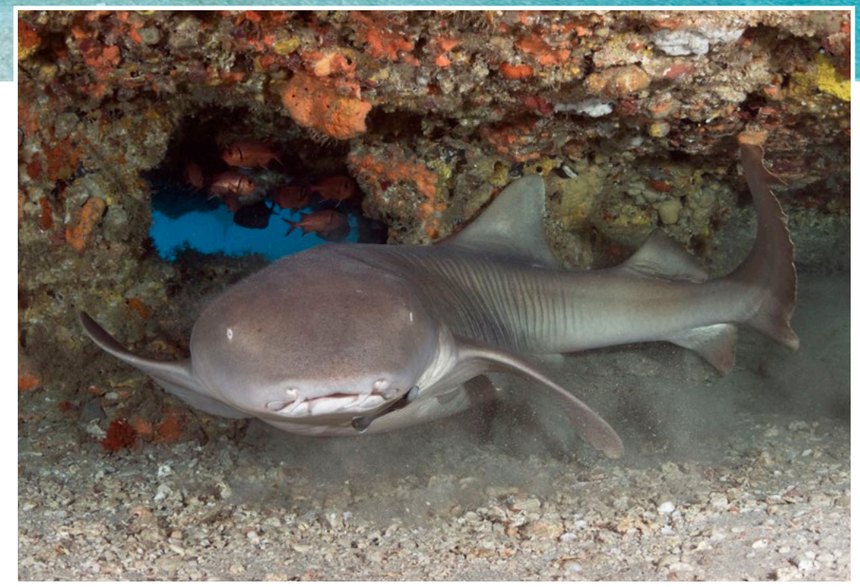
A bi-product of Dr Gruber's work in 2010 became an instrumental part in the State of Florida passing into law complete protective status for lemon sharks in state waters. The main premise for this action was based on the shark's slow growth rate, reaching sexual maturity at 12 to 15 years of age.

Illustrating just how susceptible lemon sharks are to overfishing, reproduction in this species takes place every second or third year at most, at which time the given number of pups in a litter averages between six and 18. Add to that a juvenile mortality rate of 40 to 60 percent in the first years of development, the research findings point to a very low recruitment rate for the species.

Blacktip sharks. The lemon shark's aggregating behavior I first witnessed back January 2001 is not the only that takes place. One of the most dramatic is the annual migration taken by a



THIS PAGE: Lemon sharks—over 40 adult sharks resting on sea floor in unusual aggregation behavior



CLOCKWISE FROM ABOVE: Underwater photographer with bull shark; Greater hammerhead shark; Nurse shark; Sandbar shark

variety of blacktip shark called a spinner (*Carcharhinus brevipinna*)—so named for their tendency spin as they jump into the air. These sharks work their way down the North American coastline for the same reason birds fly for winter. By the end of December, schools of the relatively small sharks (averaging 1.5m, or 4ft, in length) numbering in the hundreds, converge on the warm, near-shore waters of the Palm Beaches.

To give an idea of just how numerous these sharks are in migration, Florida Atlantic University (FAU) Associate Professor Stephen Kajiura—who's primary field is the migration habits of spinners—uses aerial photography for a large part of his counting work. Through this technique Dr Kajiura was able to tabulate between the months of January to the end of April that there can be as many as 500 sharks per square kilometer along the beach from the surf line out to half a mile offshore.

The reason so many sharks end up here is based on two adjoining factors. The first is the unique nature of the Palm Beach coast's underwater topography, which features the narrowest continental shelf anywhere along North America's eastern seaboard.

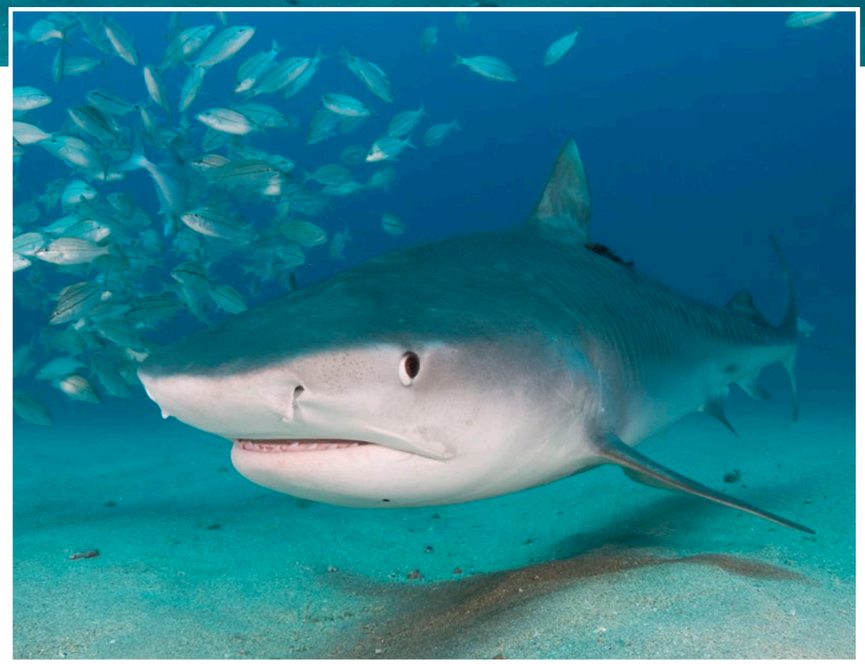
If you were to follow the bottom contours of this shelf 81km (50mi) north of Miami, you would find that it will become increasingly narrower the further north you travel. Marking the edge of the shelf, depths average 30 to 40m before dropping quickly to depths well past 500m. By the time you reach the same latitude as the city of West Palm Beach, the shelf will have reached its narrowest juncture, spanning less than 4.8km in width.

Adding to this is the geological position, that the area also happens to be the eastern-most point of land in all of Florida, placing it squarely in the path of the Gulf Stream as it pushes north. So when sharks move up or down the coast, the narrow shelf acts a little bit like a bottleneck, causing them to concentrate in greater numbers where water temperatures are most desirable.

Diving with sharks

When it comes to diving with sharks, the subject becomes a matter of personal preference. Some operations like to promote it, whereas some would rather see as little of them as possible. But, if you are the type that likes to dive with sharks, one thing is certain here in the Palm Beaches, it can be arranged.

Most shark dives are conducted out near the reef as well as on the edge of the shelf, four to seven miles offshore of northern Palm Beach County in the Jupiter/Juno Beach area. And I would not recommend them for beginners as bottom depths run between 27m (90ft)and 36m (120ft) plus, so half of the time you are in the water, the bottom can be pretty far below you. But out in this zone, the cast of players can be as numerous as they are varied, with lemon, bull and silky sharks making up the core candidates, usually followed by dusky, sandbar, tiger and greater hammerhead sharks making their special appearances.



Tiger shark (above and top right); Divers with lemon shark on shark dive (top left); Silky shark (left)

THIS PAGE: Large aggregations of goliath groupers can be found at several sites off the Palm Beach coastline during their spawning season in the months of August through September

Goliath groupers

Should requiem sharks not be of your preference, may I introduce you to the goliath grouper?

The goliath grouper (*Epinephelus itajara*) is not named after the biblical story of the giant slain by David, but for their robust size. A full-grown goliath can, at times, exceed a quarter ton in weight, measuring up to 2.1m (7ft) in length, easily making them the largest tropical reef-dwelling boney fish in the world. When confronted by one, this fellow will command your attention.

Despite their formidable size and somewhat dense demeanor, goliaths are not the ferocious brutes some spear-fishermen would like you to believe. For the most part, they can be big babies, with most habitually retreating to a safer distance or disappearing down into hole on a wreck the moment they feel threatened. Now and then, a bolder fish might sound off with a short series of loud booms, but that behavior is typically all bark and no bite.

Now and then there will be a few fish that will move towards a diver. Local underwater photographers refer to these more inquisitive and social fish as the "super models", eagerly puckering up for the camera while the photographer fires off shot after shot. Where the fish are this compliant, you can do

THIS PAGE: Tips for diving with goliath groupers (which can be spooked and bite back)—move slowly, keep hands away, and don't chase them!

almost anything short of giving it a bear huge.

If you happen to meet one of these fish, there are a few simple rules to follow:

1. Keep your movements slow and deliberate, as they also don't like being surprised.

2. Don't put your hands in front of its face as it could result in the fish biting you.

3. Don't chase the fish. Your best results will come by following rule #1.

Over the course of the past five years, diving with goliath groupers has grown to become such a significant signature trait of Florida's entire Palm Beaches region that the gentle giants just about eclipse all other attractions.

Finding one is pretty much a guarantee, as most wrecks, along with a few stretches of reefs, have a permanent resident population. Drop in on one of the wrecks like the Zion Train or MG-111 off Jupiter, or *Castor* down south off Boynton Beach, and you should find no less than eight to 12 of the barrow-shaped behemoths. Likewise, on the *Mizpah* of Danny Wrecks off West Palm Beach, you will find at least four to five goliath groupers at each wreck most of time.

Things really start to get exciting towards the end of July, as the late summer months of August and September are fish's spawning season. When it comes to going to see these fish spawn, Palm Beach is the number one place in the Atlantic to go see it happen! Actually, it's currently the only place to see it happen.

And see it you will, as these behemoth-size fish form aggregations that can exceed 90 or more, between five specific sites that lay within easy reach of dive charters between Jupiter and Boca Raton. The first three, I have already mentioned: MG-111, Zion Train Wrecks and *Mizpah*—all three dive sites sit at depths of 27m (90ft) or less. Then there is the *Castor*

Goliath grouper can be found in large aggregations during spawning season from August through September

Schools of fish gather around a goliath grouper

wreck off Boynton Beach, which sits at 34m (110ft). The fifth site called the Hole-In-the-Wall, located off the coast at Jupiter, is a bit deeper, featuring a depth profile of 36-42m (120-140ft).

In comparison to most other species of grouper, the goliath's path to romance is more a marathon than a sprint, with some individuals making the journey to their spawning grounds from considerable distances—as far away as 560km (350mi). Once in Palm Beach waters, their romance period will take up the entire months of August and September.

The takeaway is the opportunity of getting incredibly close to an entire spawning aggregation of a critically endangered species in one of the most accessible places in the world where underwater visibly can go from good to exceptional—18 to 30m (60 to 100ft). Not only is it a spectacle that sometimes defies words, it also makes for one hell of a photo op.

Back to the question, what is there to experience in Palm Beach? I would think you will find a lot more than: "Oh yeah, you do a lot of drift diving there."

Gulf Stream effect

Where the Palm Beach coast differs from the Florida Keys is the variety and nature of its coral reefs. Instead of shallow spur and groove fringing reef formations synonymous of the Keys, bottom contours are comprised of massive, elongated ancient limestone from earlier millennia when sea levels were 9 to 43m (30 to 140ft) lower than they are today. Varying in height from 1m (3ft) to as much as 5.5m (18ft) above the sand, these elongated limestone escarpments are far from featureless, which brings us back to the Gulf Stream.

This mighty "river within the sea" is the second largest oceanic current on the planet, which begins down the western Caribbean, with a pathway that takes it up and around South Florida, up the coast and on into the North Atlantic, all the way to the British Isles.

As a result, this massive flow of clear, tropical water tracks closer to shore along Palm Beach County than anywhere else along the North American Continent. This provides the clearest waters divers will encounter in

Divers at Castor Wreck;; Barge Wreck (top left); Governor's River Walk wreck (top right and left)

Florida, with underwater visibility reaching up into the 24 to 30m range.

The proximity of the Gulf Stream does far more than provide divers with inviting water clarity and warmer temperatures in the winter. The Gulf Stream's constant flow enlivens area reefs, bringing the nutrition needed for corals, sponges and bottom fish life to thrive.

Evidence can be seen most readily on the outlying reefs and wrecks in the 14 to 28m depth range where the presence of colonial sponges, gorgonians and hydra-corals are highly abundant and most varied. The most visual features range from orange elephant ear sponges and deeper-hued orange and red tree sponges to my favorite of the bunch—the red polyp octocorals, with their eye-popping vibrant red to iridescent orange hues. But all that is mere garnishing on the plate when you see what the main entrée has in store.

Between these two adjoining factors (the width of the shelf and the presence of the Gulf Stream), coastal waters of Palm Beach serve as an oceanic highway of sorts for a multitude of open ocean and migratory species of marine life from sharks to jacks, mackerel, tuna, billfish and sea turtles to the less expected, like the large ocean sunfish (*Mola mola*) or passing humpback and North Atlantic right whales.

Drift diving

The Gulf Stream influences almost every aspect of diving along the Palm Beach coast, from what you see to how you actually dive it.

The primary practice is the "live boat" method in which the boat, between deployment and recovery of divers, follows the divers overhead while they travel with the current exploring the reef or wrecks.

Here's how it works: As the boat gets close to the intended dive site, divers are given a 10-minute warning to gear up.

CLOCKWISE: Diver at propellor, Hell Diver plane wreck; Fish schools take refuge in the Tunnels; Snook; French grunts at Barge Wreck

Once there, the captain lines up the boat a short distance up-current of the intended reef tract or wreck. Once in position, the boat is put in neutral and a jumpmaster-style type command of "Dive, Dive, Dive" is issued. The dive group steps overboard and begins their descent.

At this point, they will not feel any affects of the current, because both they and the boat are moving with the flowing water. It is only as they approach the bottom, they will begin to notice that they seem to be flying over the ground, at speeds that could range from barely describable to brisk, depending on the location and the nature of the currents on that particular day.

Once settled, near the bottom, divers can relax and allow the current to do most of the work, while staying in visual range of the divemaster and/or group leader who carries a tethered surface float. This style of diving actually requires less exertion than diving on a reef or wreck with no current, and divers are able to cover long distances following the reef contours as they go, thereby increasing their odds of seeing the region's big-ticket items.

At the end of the dive there is no need to fight the current to get back to the anchor line, or remember where the boat is. Instead, the group simply heads for the surface, performing a safety stop along the way, and the boat comes to them for re-boarding. The process is surprisingly simple, convenient, and most of all, a lot of fun!

Where to dive

— Palm Beach departure points

Palm Beach County's 72km (45mi) long coastline is divvied up between four inlets where local dive charters are based and from which divers are able to access a large number of sites several miles in either direction of those corresponding inlets. Starting at the southern most end of the county, the four inlets are located as follows:

Boca Raton Inlet – Situated on the southernmost point of Palm Beach County, dive operations have the unique advantage of not only addressing many of the same wrecks and reefs that sit within reach of the Boynton and Delray Beach area, but also several of Broward County's famed collection of wrecks offshore of Pompano Beach.

Boynton Inlet – Also called South Lake Worth Inlet, this inlet provides access to the southern half of Palm Beach County, with its own collection of reefs and wrecks for divers to explore off Boynton Beach, from Lantana south to Delray Beach.

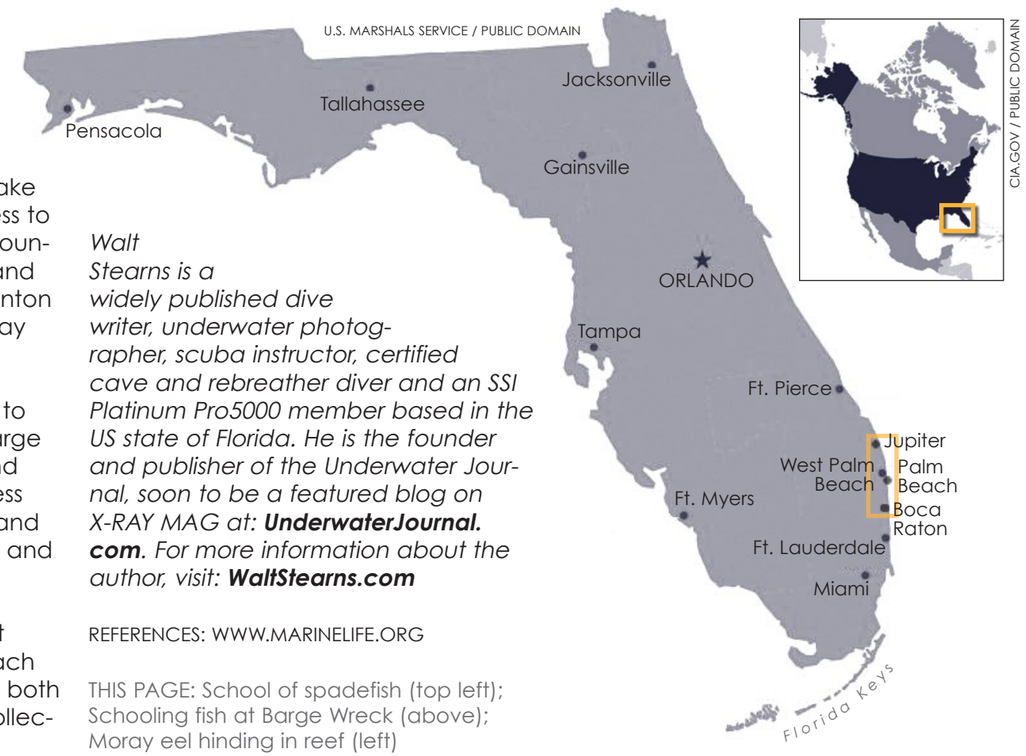
Lake Worth Inlet – located nearest to the city of West Palm Beach, this large inlet cuts between Singer Island and Palm Beach Island, providing access to a large reach of both northern and central Palm Beach County's reefs and wrecks.

Jupiter Inlet – This inlet is located at the most northern end of Palm Beach County, providing direct access to both Jupiter and Juno Beach's prime collection of wrecks and reefs.

Walt Stearns is a widely published dive writer, underwater photographer, scuba instructor, certified cave and rebreather diver and an SSI Platinum Pro5000 member based in the US state of Florida. He is the founder and publisher of the Underwater Journal, soon to be a featured blog on X-RAY MAG at: ***UnderwaterJournal.com****. For more information about the author, visit:* ***WaltStearns.com***

REFERENCES: WWW.MARINELIFE.ORG

THIS PAGE: School of spadefish (top left); Schooling fish at Barge Wreck (above); Moray eel hinding in reef (left)



Map of US State of Florida

Florida's Black Water Diving

— Illuminating Zooplankton & Invertebrates of the Deep

Text and photos by Tom Hayward

Comb jelly (right) and planktonic tunicate (below) PREVIOUS PAGE: Unidentified jellyfish

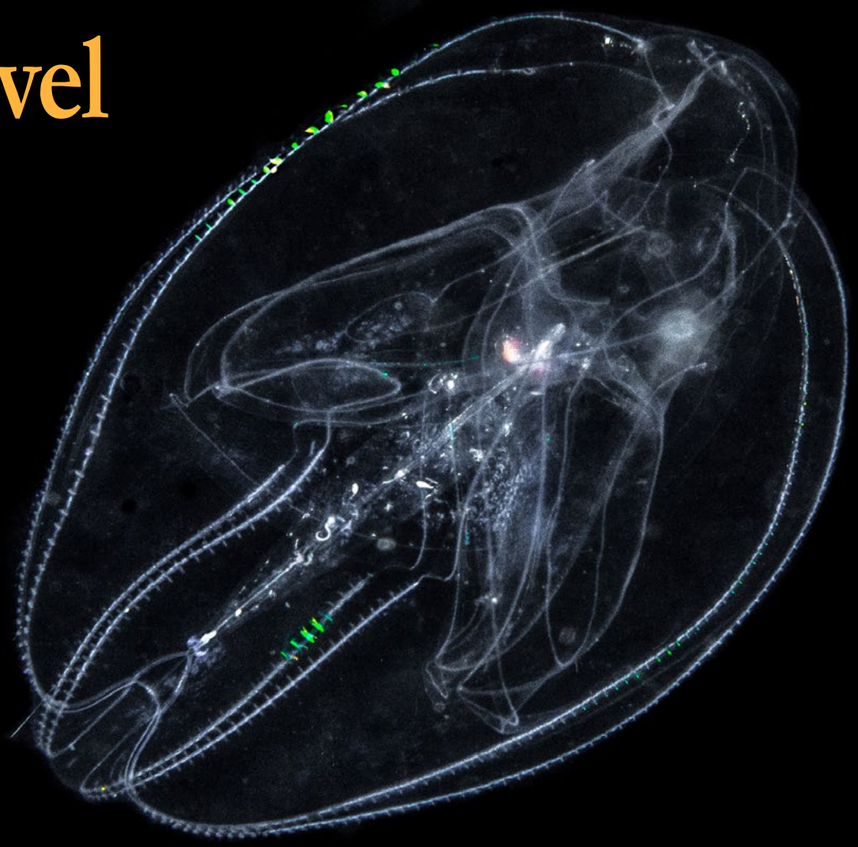
As divers, we watch underwater documentaries from the BBC, National Geographic and other media with keen interest. Deep water explorations, or photos and video from exotic locales, hold us rapt. How many times have you wished you could sail on one of those research vessels, if only to catch a glimpse of a rarely seen species? For those without the resources to join such expeditions, there is an affordable alternative: Enter the Black Water dive—long offered in Hawaii but now available on the east coast of the continental United States.

[*ed.— Black water diving is essentially diving over the abyss in open water at night, often far from shore, with the black depths of the sea underneath, in order to observe small critters like zooplankton and invertebrates.*]

At night, tiny creatures that live in the deep abyss (500ft/152m or more) rise to the surface to feed under the cover of darkness. These zooplankton and larval animals are alien to the average diver. They are likely translucent and do not resemble their adult counterparts. Every glimpse around the water column yields an unknown addition to one's personal catalog. Best of all, it happens a short boat ride off the coast of Palm Beach County, Florida.

Diving

My evening began boarding the dive boat *Sirena*, owned and operated by Pura Vida Divers on Singer Island, Florida. The vessel is a 30-foot Island Hopper, carrying a maximum of 12 div-



Comb jelly (left) and assorted unidentified species (this page) of zooplankton, invertebrates and chains of salps

drifted with the divers and gave a great visual reference of one's depth.

Most animals will be between five to 8m (15 to 25ft) so going deeper than 12m (40ft) is unnecessary and discouraged. Another great benefit of this rig was the ability to hang onto the rope until one felt comfortable with one's surroundings. With the ball having an advertised buoyancy of 358kg (790lbs)[1] and the rope a tensile strength of 6,700kg (14,800 lbs)[2] everyone could hang on with confidence. This was especially beneficial to the first-timers.

The profile required only a single tank and the captain generously allowed one hour for the dive. On one's first dive of this type, it usually takes most of that hour just settling in. (Think about your first night or reef dive without an instructor.)

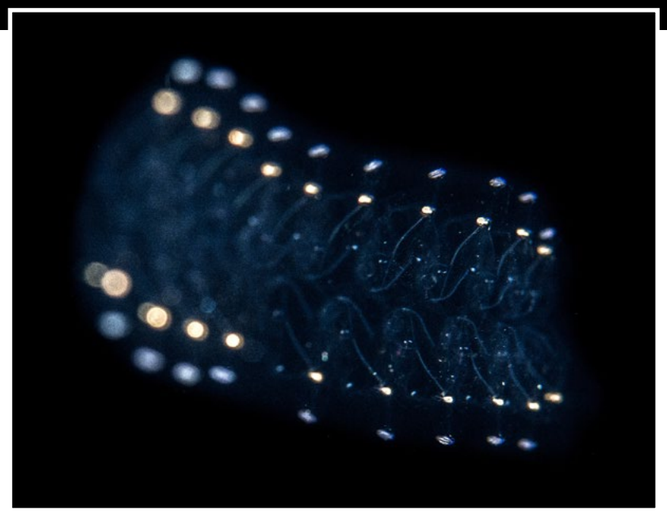
Once I established my personal dive area, the first thing I noted was the multitude of particulates. It resembled a loose dust storm. Suddenly, on the periphery, I detected movement—the first creature, spotted.

As my eyes adjusted to the surroundings, I realized I was centered in an explo-

[1] WWW.TAYLORMADEPRODUCTS.COM/CATALOG

[2] WWW.CORTLANDCOMPANY.COM/SITES/DEFAULT/FILES/DOWNLOADS/MEDIA/PRODUCT-DATA-SHEETS-NYLON-DOUBLE-BRAID.PDF

This colorful little squid is about the size of the cap for a ballpoint pen



ers. Once the standard safety and amenity briefing was completed and we cleared Lake Worth Inlet, the boat turned south for a short ride along the beach. This was a drift dive in the Gulf Stream current. The captain was anticipating our northerly speed, so we ended our adventure near the inlet. Once the distance was satisfied, he turned due east and continued offshore until the proper depth was reached. When optimal conditions were met the boat was throttled down and the well-honed crew went to work setting up.

Being a night dive in 152m (500ft) plus depth of water, there was no useable bottom or reef for reference. Dean Shuler (our captain and co-owner of Pura Vida) had addressed this problem with a 34-inch white round fender. To this ball he attached a 12m (10ft) length of 1.6cm (5/8in) braided nylon rope marked at 3m (10ft) with a single glow stick, two glow sticks at 6m (20ft), three sticks at 9m (30ft), and at the bottom, an LED light aimed straight up. Of course, weights were added to keep it vertical and a lighted dive flag was tethered to the top. This arrangement

THIS PAGE. Assorted unidentified species of zooplanton and invertebrates on a black water dive off Florida

sion of life. Many delicate creatures moved, pulsed, and lit up, while performing a dance to unheard music.

About two thirds into the dive, I noticed a miniature circus being performed within inches of my light. Tiny creatures were spinning and pirouetting at speeds that did not allow identification. Time continued on and the symphony built to a crescendo. Suddenly I remembered to check my computer and realized, sadly, the allotted time had elapsed and the subsurface dive was over.

This night was not over yet, though. As I floated along the surface waiting to be picked up, I made sure to put my mask in the water to see what was there. At this point, the area had been lit by various sources for an hour and many species were oriented right there on the surface. It was here that one might discover one's find of the night. If nothing else, it was sure to entertain while awaiting the boat.

Back on the boat everyone was full of excitement. Each diver was showing photographic prizes or relating favorite moments. As the gear was unloaded back at the dock, each diver was vowing to make the next black water dive.

However, don't expect it to be the same. Yes, there will be the familiar and also the new. Such is the dynamic of seasons. One night the water may be filled with larval fish and the next loaded with tiny squid about the size of an ant. One thing you can count on is a bounty of the strange, the delicate and the beautiful.

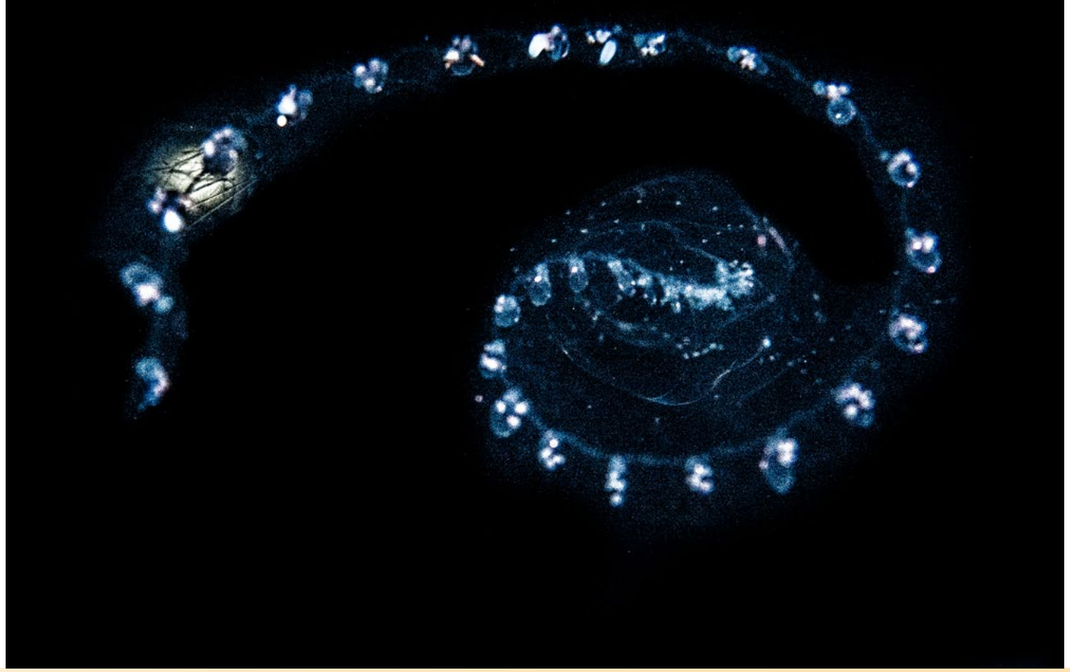
Best time to dive

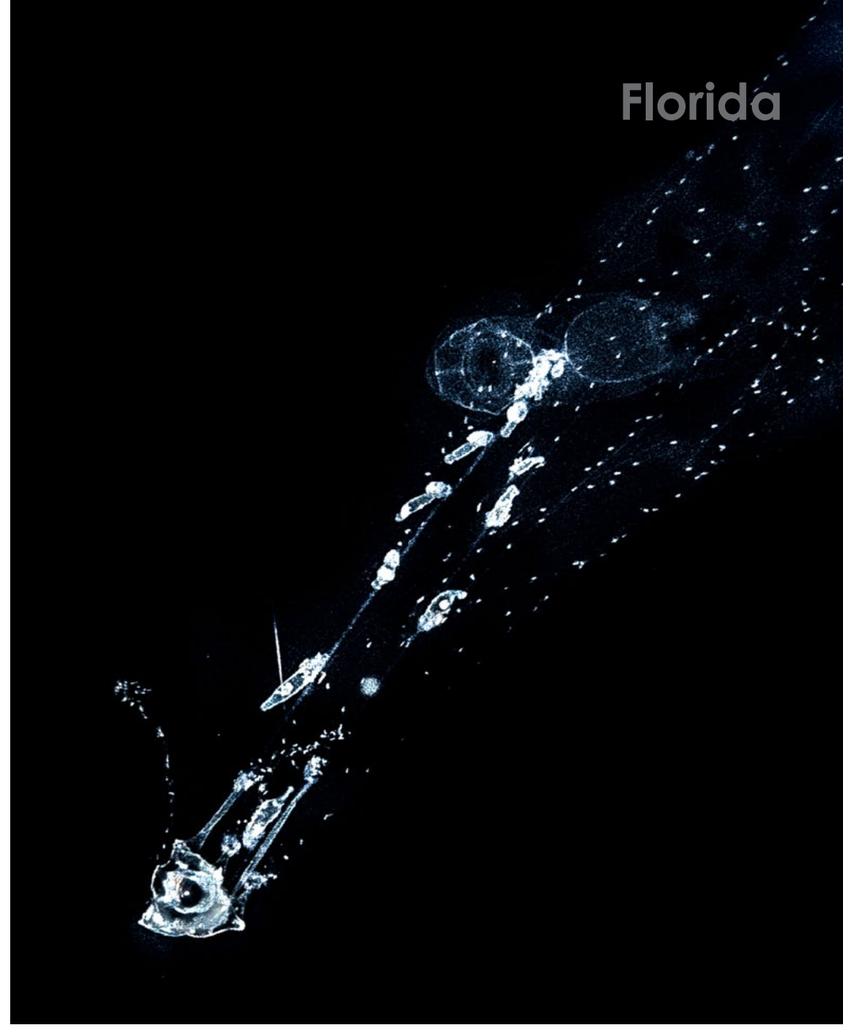
The best time for this type of dive is between late spring and early fall when the ocean is relatively calm. During the winter months, there are many days of wind from a northerly direction. These winds push against the Gulf Stream current and build seas from the uncomfortable to the dangerous.

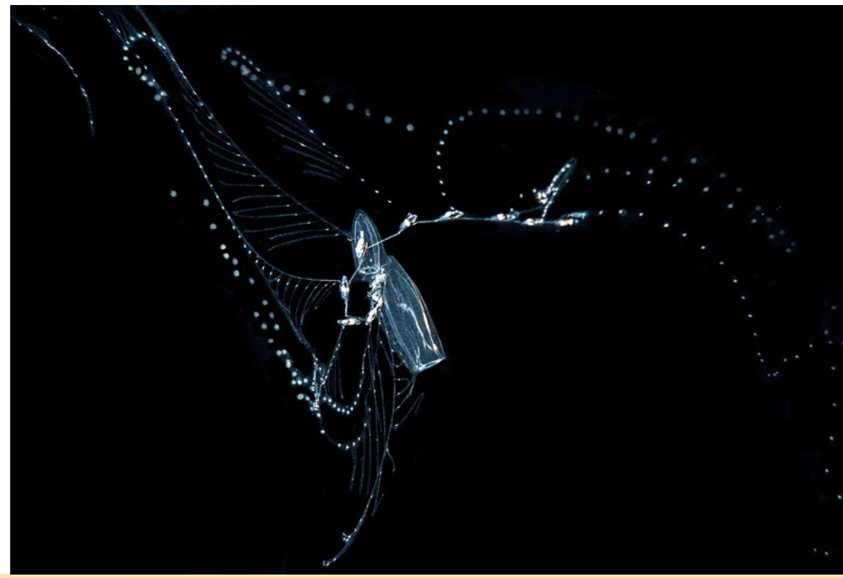
Black water dives may seem a little intimidating to the uninitiated but rest assured there is a dive master in the water keeping an eye on things. If a little more personal touch is wanted there are always many capable dive masters for hire to help get you get started.

If you are looking for something new and exotic, come join the next black water dive. Who knows, you may discover a completely new species. One thing you can count on, many species will be new to you. ■

American underwater photographer Tom Hayward hales from New England, where he lived for 53 years. He is a PADI Master Scuba Diver, having received his Open Water certification in the early 1990s. Now retired from Verizon, Hayward currently lives with his wife in Stuart, Florida, and is a member of the South Florida Underwater Photography Society (SFUPS). For further photos, go to: ***thayward.smugmug.com****.*







Florida Springs

Art of the Aquifer

Text and photos
by Amanda Cotton

Florida has a secret—albeit not a very well kept one: it is home to some of the most exquisite freshwater environments in the world. The vast network of springs and rivers located throughout the central and northern areas of the state offer bodies of water with unusual and colorful flora and fauna. State parks across the region are home to many different types of springs from turquoise-blue gushing spring heads surrounded by deep basins to static-flow sinkholes filled with tannic water.

The Florida Springs are jewels. Overflowing with life, the springs offer refuge to a multitude of animals including reptiles, freshwater fish, migrating and resident populations of birds, and local Floridians. Filled with bright turquoise and gin-clear water, the

THIS PAGE AND PREVIOUS PAGE: Underwater images of freedivers in the Florida Springs, from the "Florida Gems" fine art project by Amanda Cotton, documenting the beauty found in this gin-clear freshwater environment. Freediver model is surprised by an unexpected visit from a Florida manatee (left)

The Florida Springs are jewels. Overflowing with life, the springs offer refuge to a multitude of animals including reptiles, freshwater fish, migrating and resident populations of birds, and local Floridians.

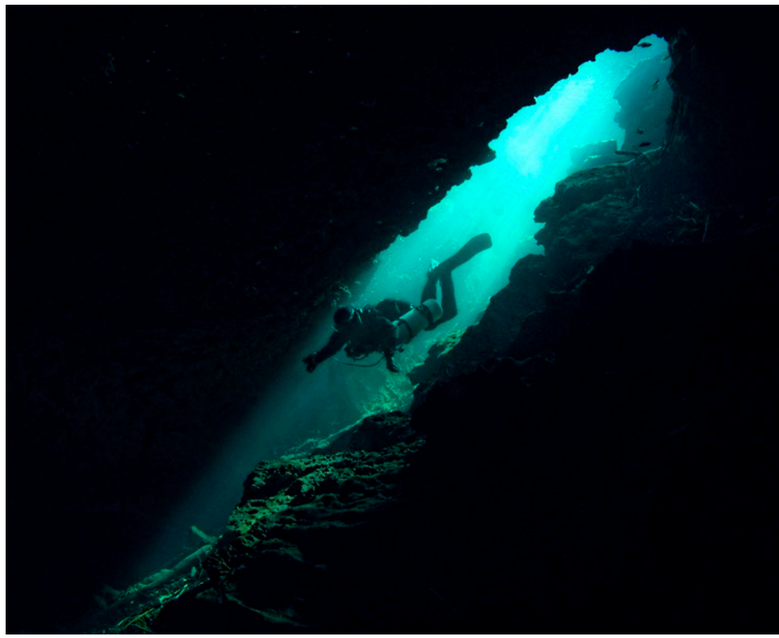
A young girl plays underwater (above); Florida Springs offer recreation and retreat for locals and visitors alike. Cave diver (left) exits Jackson Blue, a system found in the Mill Pond at Marianna, Florida

basins of most springs are surrounded by thick vegetation and exceptionally tall trees, offering visitors a break from the concrete jungles located only a few hours away in cities like Orlando and Miami.

Floridan Aquifer

Florida's aquifer feeds the springs and rivers, branching throughout the state in an elaborate maze of underground tunnels ranging from 100 to 400 feet below the surface. This system nourishes the state, providing fresh water to millions of residents in all areas of Florida.

Much of the water travels down through the Floridan Aquifer by way of rainstorms passing through Georgia and territories to the north. The relationship between these two regions can be unpredictable



THIS PAGE: Underwater photos of freedivers in the Florida Springs, from the "Florida Gems" art project

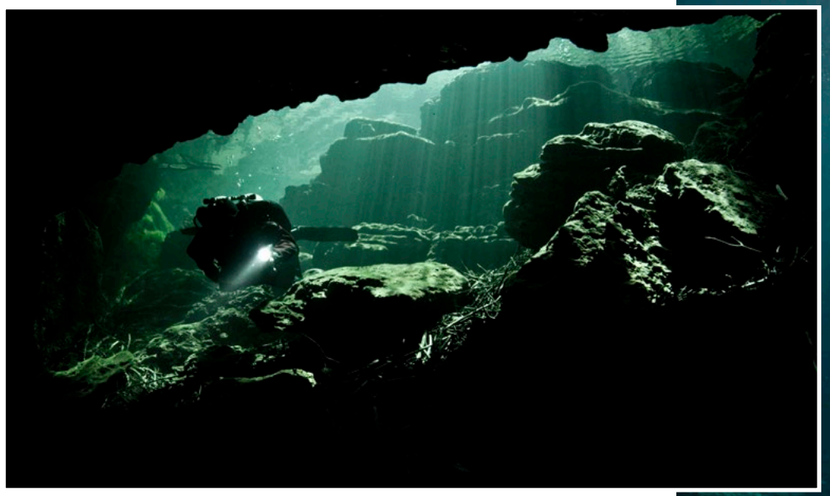
Sidemount cave diver enters Peacock Springs (P1)

THIS PAGE: Underwater photos of freedivers in the gin-clear waters of the Florida Springs, from the "Florida Gems" art project

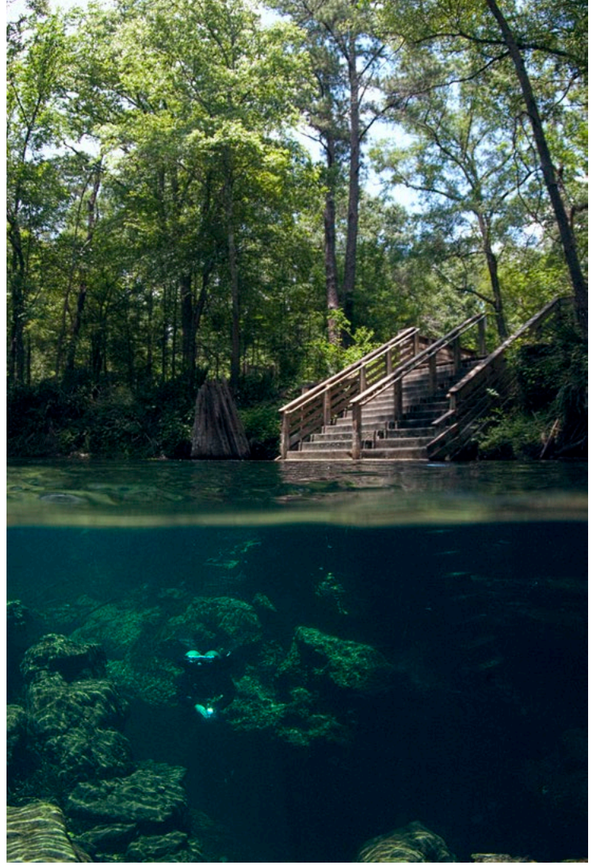
and tumultuous.

When too much rain passes through the area north of Florida, the rivers and springs will often crest the river banks and flood the surrounding low lying plains, causing damage to local areas of central Florida and closing parks for weeks on end, resulting in a negative impact on the local community and businesses. The concerns do not end there, however. As the demand on the water supply has increased with the population boom in Florida over the last few decades, the water levels have plummeted, leaving many to wonder if the Floridan Aquifer will be able to survive long into the future.

The first line of defense for this important water system has been the scuba divers who frequent the area. With the scenic underwater cave systems offered by the aquifer, divers from around the world travel to dive and



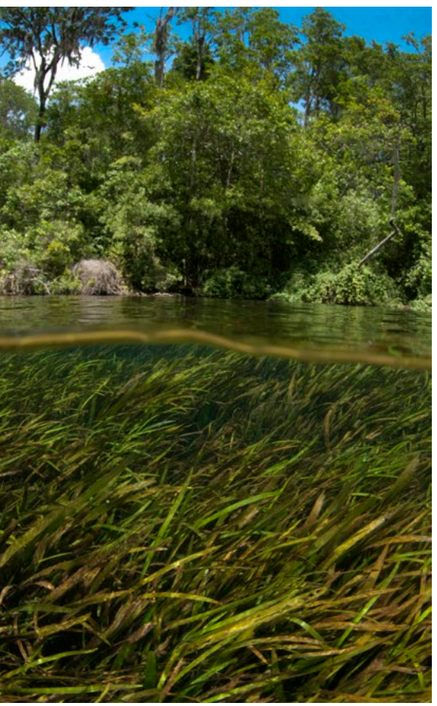
Cave diver enters Peacock Springs (P1)



Wes Skiles Peacock Springs State Park (left); Cave diver exits from Jackson Blue, a system found in the Mill Pond at Marianna, Florida (far left and below)

Florida

Sidemount divers enter Jug Hole, Ichetucknee Springs (left)



Rainbow River, Florida

train in the Florida caves. These divers have seen first hand the impact and damage done to the systems, and are vital in gathering information and imagery to help in efforts of protection and preservation of this water source.

Raising awareness

"Florida Gems"—a project documenting the beauty of the Florida Springs and the connection many people have with them—first began in the early months of 2012. This visual art project focuses on the exquisite beauty found deep inside the underwater cave systems, featuring photography of cave divers. It also features images of models freediving in basins and river ways, as well as split-shots melding imagery of both the topside world and the realm below the water's surface.

In an effort to share this underwater world with those possessing the power to protect it, the imagery from "Florida Gems" has been used at local art exhibits, city council meetings and more. It is the hope of the project to show those in positions of control how vital and delicate this ecosystem is to the health and well-being of the state of Florida.

With an approach of educating its audience, projects like "Florida Gems" hopes to empower individuals, businesses and organizations to stand up for the protection of the Florida Springs and aquifer system as a whole.

There are many in the local community focused on improving conditions for the fresh water resources of Florida and beyond. Jill Heinerth, a world renowned underwater photographer and filmmaker created "We Are Water"—a project with a primary goal of educating the public in getting involved and how they can help.

With protection and attention to the current issues they now face, Florida's springs can continue to flourish and shine as the gems they are. ■

Professional Nikon Photographer Amanda Cotton is a widely published underwater photographer based in Florida. Her work has been featured in science and diving magazines as well as National Geographic, BBC, Discovery Channel, The Weather Channel, Smithsonian Magazine, Times Publishing, CNN, Natural History Magazine and Earthweek. A member of The Explorers Club and the Ocean Artists Society, Cotton was recently inducted into the Women Divers Hall of Fame. For more information: ***Acottonphoto.com***

Edited by
Rosemary 'Roz' E. Lunn

POINT & CLICK ON BOLD LINKS

Equipment

OceanPositive

Fourth Element's OceanPositive active swimwear range is now available. This radical collection is manufactured from abandoned ghost fishing nets that have been harvested from the seabed by dive teams in Europe and North America. Fourth Element has combined the recycled spun nylon yarn with Lycra and delivered a 'Grave to Cradle' solution that Dr Sylvia Earle enthusiastically inspected at last year's DEMA Show. "This is a fantastic idea, [one which] demonstrates what we can, and should, do for the oceans," she said. Fourth Element's swimwear collection includes two costumes and four bikinis in a range of five sizes (8, 10, 12, 14 and 16) for ladies, whilst men have the choice of swimming trunks or shorts in fives sizes (small, medium, large, extra large and XXL). **Oceanpositive.net**

Lightbuck

After the inventor found himself underground on a London tube train without any light he decided to design something really small that anyone could carry, that could provide them with low level illumination in extreme conditions. The resulting impact resistant LITEBUCK module has three modes that can be activated by one hand: rapid flashing strobe, slow flashing strobe, or permanently on, providing light for approximately 100 hours. The module can be inserted into a variety of housings, thus this 18g light can be easily attached or buckled to back packs, helmets or diving equipment. The LITEBUCK has a 50m "waterproof" depth rating. It is also a potentially useful piece of kit for divers who hike, cycle, climb or play outdoors in harsh environmental conditions. Available in red, green, white, yellow and infrared LED colors. **Litebuck.com**

Frameless classic

Scubapro launched their FRAMELESS mask in 1989. Twenty-six years later it would be fair to say this perennial favourite has stood the test of time. Now Scubapro has unveiled a white version, manufactured from soft, anti-allergy silicone. This should be reasonably durable whilst providing decent comfort. **Scubapro.com**

2020Vision

APD's 2020VISION has been designed to improve the divers understanding of the data they require. For instance the status changes are indicated by different colours. The real-time information is delivered in larger, ultra-crisp high-res fonts and icons on a high-contrast, 43% bigger screen which AP Diving state "offers brightness, clarity and excellent readability (even in poor viz) from all viewing angles." Whilst the screen is larger, the durable marine grade aluminium handset itself is 40% smaller and more compact than the previous AP monochrome version. Even the glass has been upgraded. It is now scratch-resistant and chemically-ionised toughed glass. **APDiving.com**

TX1

Hollis has launched a six gas dive computer capable of supporting open circuit air, nitrox and trimix scuba diving. The TX1 uses the Bühlmann ZHL-16C algorithm, with the diver able to adjust their gradient factors. Features include an audible alarm, three axis digital compass, stop watch, countdown timer and customizable dive screens. The TX1 also has upgradeable firmware. **Hollis.com**

Suunto and Aqua Lung to separate ways

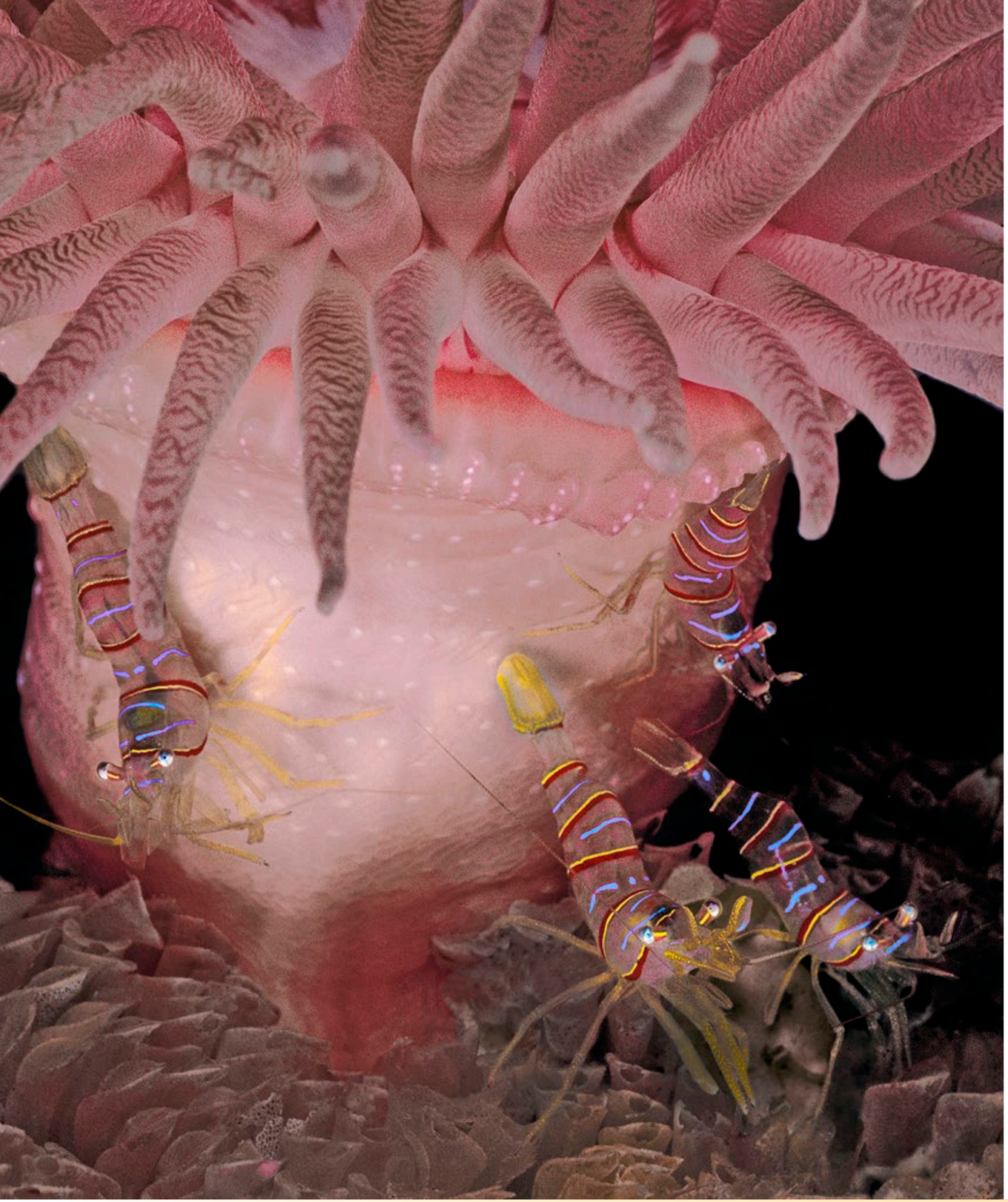
Suunto and Aqua Lung have announced the distribution cooperation for Suunto dive computers will end 31 December 2015. The current distribution arrangement, including sales and warranty service, will continue to be managed by Aqua Lung until the end of 2015.

"After many successful years together, our strategies have evolved differently and we both felt it is best to go separate ways. We would like to thank Aqua Lung for the long history of successful cooperation," Suunto CEO Mikko Moilanen stated on July 20.

Aqua Lung said that the company would share further details of its new collection with its dealer network in the fall of 2015.

Aqua Lung also said it would continue taking orders and supplying current Suunto diving products, along with handling warranty and customer service support until the end of 2015 in the countries Aqua Lung distributes Suunto dive products.

In the United States, Suunto Dive will be represented by Huish Outdoors; in Germany, Austria and Switzerland by Amer Sports Deutschland GmbH; and in France, Spain, Italy and Portugal, Suunto will be represented by Beuchat. The new distributors will handle all enquiries regarding Suunto dealerships in their respective markets. ■



Candy stripe shrimp a.k.a. clown shrimp (*Lebbeus grandimanus*) are often found on rocky bottoms in association with anemones, remaining on the base of the column or foraging around on the oral disk picking up scraps. The shrimp seems immune to the anemone's nematocysts.

Symbosis
— Partnership Between Species

Text by Peter Symes
Photos by David Hall

Marine ecosystems are complex and dynamic places in which species interact in a myriad of ways: they both compete and cooperate for protection, shelter, food and various other resources. On individual species these interactions may have negative—such as competition or predation—or positive effects in the form of symbiotic relationships.

The term "symbiotic" has long since made its way into everyday parlance; we use it, often in a casual way, to loosely describe all sorts of mutually beneficial relationships in our lives including business, social and personal matters, but what does it actually mean?

The word symbiosis literally means "living together,' and in biology, it refers to a close and usually obligatory association of two organisms of different species. While it is often assumed that this relationship is mutually beneficial, it is, however, not always the case. Symbiotic relationships include mutualism, commensalism and parasitism. In mutualism, different species have a cooperative or mutually dependent relationship where both organisms benefit. In commensalism, one benefits and the other is unaffected. In parasitism, one benefits at the expense of the other.

Mutualism

Two organisms of different species are said to exist in a mutualistic relationship when each individual benefits from the activity of the other. This relationship can be either external or endosymbiotic, whereby an organism resides in another's body or cells such as the photosynthetic algae harbored in corals.

Examples that will be well known to divers include the relationship between sea anemones and anemonefish. The sting of the anemone's tentacles provide the fish with protection from predators, while the fish defend the anemone against butterflyfish, which feed of anemones.

Meanwhile, but less obviously, waste ammonia from the fish also nourish the algae residing in the anemone's tentacles. Since these algae are also in an endosymbiotic relationship with their host coral—they provide photosynthates and get protection and supply of inorganic nutrients in return—it goes to show that there is often more than one aspect to symbiosis, and many relationships can exist concurrently, often in an intermeshed manner.

Commensalism

Commensalism is a symbiotic state in which one organism benefits from the other without affecting it. The term stems from Latin *commensalis*, meaning "sharing a table". In biology, it describes the relation between

individuals of two species in which one species obtains food or other benefits from the other without either harming or benefiting the latter. The benefitting species, the commensal, may obtain nutrients, shelter, support, or locomotion from the host species, which is usually significantly larger and mostly unaffected. However, commensalism is often a tricky case to argue. As any close interaction between two organisms is unlikely to be completely neutral for either party, relationships identified as commensal may in fact be subtly mutualistic or parasitic.

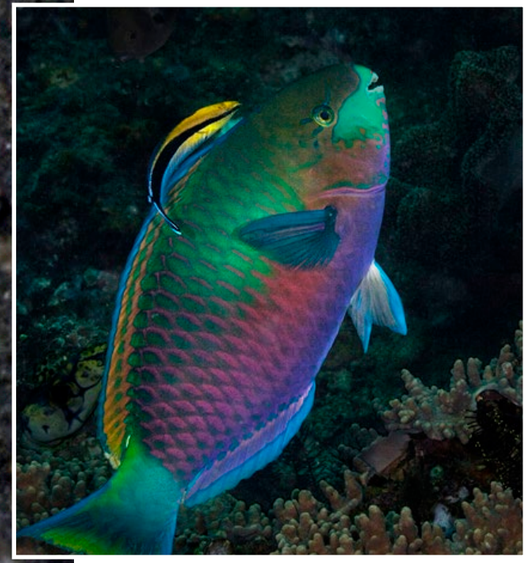
Phoresy—an association in which one animal is attached to another exclusively for transport—may hinder the host by making movements more difficult or cause it to expend extra energy. Barnacles on whales and remoras attached to sharks or algae growing on turtles' shells are examples of such commensal relationships. Other forms of commensal relationships that are less direct include one organism using another for housing (*inquilinism*) or using something another created, after its death (*metabiosis*) such as is the case with hermit crabs, which use shells from gastropods to protect their bodies, as shown on the image on the left.

Parasitism

An interaction between species wherein one, the parasite, benefits at the expense of the other and will often live in or on its host for an extended period of time. Although parasitism applies unambiguously to many cases, it is part of a continuum of types of interactions between species, and in many cases, it is difficult to demonstrate that the host is harmed. Parasites that live on the outside of the host, either on the skin or the outgrowths of the skin, are called ectoparasites (e.g. lice, fleas and some mites) while those that live inside the host are called endoparasites (e.g. parasitic worms).

Community

How do symbiotic relationships affect the ecosystem? An eco-



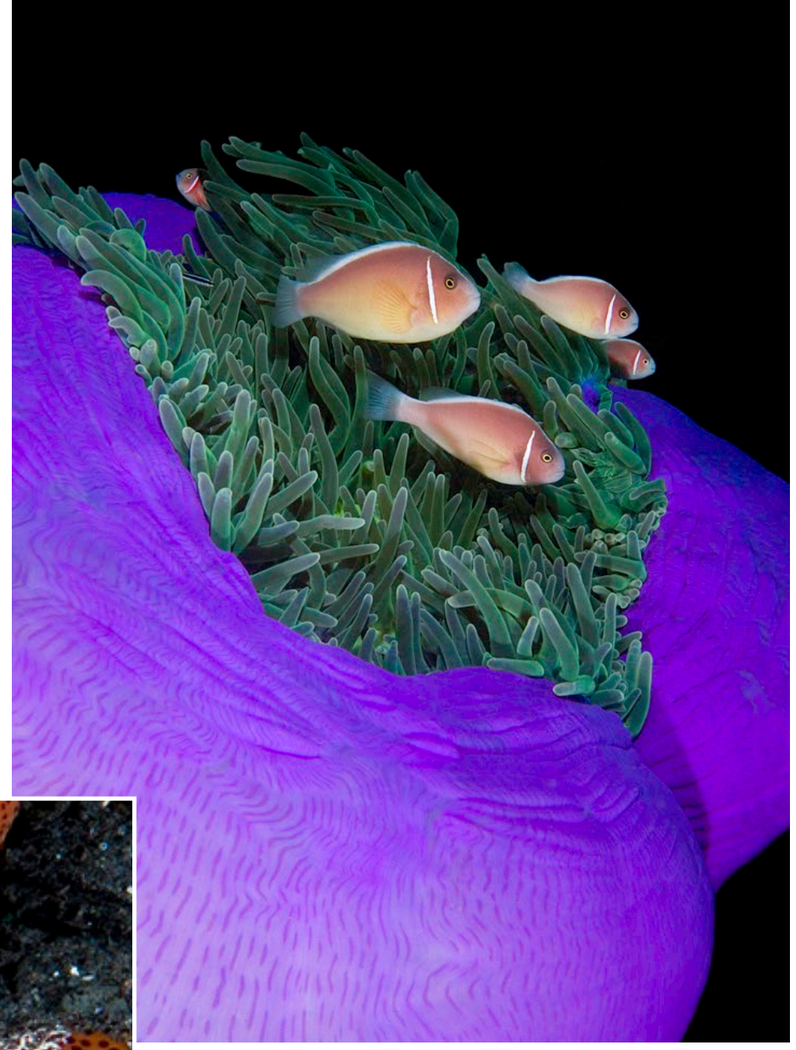
Symbiosis

Like other cleaner wrasses, the blues-treak cleaner wrasse, *Labroides dimidiatus*, eats parasites and dead tissue off larger fishes' skin—in this case a parrot fish— in a mutualistic relationship that provides food and protection for the wrasse, and considerable health benefits for the other fishes.

An example of metabiosis are hermit crabs (left) using gastropod shells to protect their bodies—this case seemingly a whelk. The shell is adorned by anemones. Anemones are predators, which catch small organisms floating past in the current. By being carried about by the crab, they get further exposure as well as catching drifting scraps from the crabs meals. The anemones stinging tentacles helps protect the crab while mobility probably also helps the anemone—i.e. there are reports of the sea anemone itself being eaten by the sea slug *Aeolidia papillosa*.

This sponge crab (below) is wearing a "hat" that consists of a living sponge colony; the brown sponge is itself covered by a colony of yellow ascidians. The sponge and ascidians gain mobility that they do not normally have, while the crab gains a disguise, and is further protected by toxic chemicals produced by the sponge. Unlike decorator crabs, the sponge is not actually growing on the crab's shell; the crab uses its back legs to hold the sponge in place.

An *inquiline relation* is said to exist when an animal lives commensally in the nest, burrow or dwelling place of an animal of another species. The yellow shrimp goby (above) shares a burrow with a commensal alpheid shrimp such as a pistol shrimp. The shrimp has notoriously poor eyesight, digs and cleans up a burrow in the sand in which both the shrimp and the goby fish live. The goby, meanwhile, has particularly good vision, but is less adept at creating burrows which, of course, offer valuable protection on the reef. The shrimp maintains almost constant contact with the fish with an antenna and is alarmed by touch when the fish retracts to the burrow for safety.



Symbiosis

Anemonefish (left) are fiercely protective of their host anemone warding off anemone-eating fish. In turn, the stinging tentacles of the anemone protect the clownfish from its predators. A special mucus on the anemone fish protects it from the stinging tentacles.

Bentic ctenophores have taken up residence on a sea star (center). These colorful invertebrates that look like flatworms are related to the comb jellies and cast their feeding tentacles into the current.

system is the interaction between living and nonliving things in a particular environment. Ecosystems can be likened to complex marketplaces through which resources flow, are traded and passed on between entities in a multidimensional web.

Whether the currency of this market should rather be viewed as energy, information or entropy, is the subject of a never-ending scientific discourse. Suffice it to say, all organisms and parts within this place are interacting all the time, and adjustments must occur if the organism is to survive. Since cooperation is fundamental to achieve integral participation, good results and ultimately, survival, symbiosis has been key in natural evolution.

Competition, predation and symbiosis are three processes that organise ecological communities. All these interactions vary in strength and duration from intimate, long-lived symbioses to brief, weak interactions through intermediaries.

While competition and predation *controls the abundance and diversity of species* in a community, symbiosis links species and serves to *increase community organization*, and with it, complexity and specialization in an ongoing process, until resources get limited or a structural collapse occurs, i.e., due to catastrophic events. ■

These cryptic teardrop crabs have attached bits of red sponge to themselves, and the sponge has grown and spread to completely cover the crabs' shells. The sponges not only disguise the crab, but also contain chemicals that make them distasteful to potential predators.

Children in Malaysia take part in PADI Seal Team course offered by Kids Scuba near Kuala Lumpur

Children & Diving

—Current Recommendations & Considerations

Text by Konstantinos Alexiou
Photos courtesy of Hj. Syed Abd Rahman of Kids Scuba Malaysia

Is it safe? When are young too young? The topic of children and diving has been and will remain controversial and highly emotional. The following article intends to provide a review of current recommendations regarding medical issues and fitness as well as important considerations related to the involvement of children in underwater activities.

The participation of children in underwater activities is not something new. It started growing in the mid-1980s. For many years now, the Confédération Mondiale des Activités Subaquatiques (CMAS) and the Professional Association of Diving Instructors (PADI) have introduced formal training programmes and guidelines for teaching children as young as eight [5]. Today, PADI alone certifies more than 10,000 young divers per year between the ages of 10-14 [1].

How children differ from adults

Physical differences. Children are usually of smaller size and have a less powerful stature compared to adults. Their lack of strength and endurance has an impact on their ability to cope with the heavy and bulky diving gear while kitting up prior to the dive and when swimming underwater. Children have a larger ratio of surface area to body mass; therefore, they are more prone than adults are to heat loss in cold environments. Increased drop in their core temperature (hypothermia) may occur in underwater activities because of the high thermal conductivity of the water [4].

Physiological differences. Children are under physical and physiological development; simply put, they are still growing.
Their growth plates (epiphyseal plates) are active until the late teens or early 20s where the epiphyses "close" and bone elongation stops.

It has been suggested that inert gas bubbles tend to form in the epiphyseal tissue causing decompression illness (DCI). Such an injury to the epiphyses may impair the process of bone growth. According to Dr Simon Mitchell [4], it is not wise to draw any solid conclusion regarding this theory, as there is insufficient evidence and no clinical reports of apparent epiphyseal damage during decompression.

Another concern is the equalization. Up until the age of around eight, the Eustachian tubes are narrower and more horizontal than later in life. By the age of 12, the Eustachian tubes develop into their adult-like form, making equalization of the pressure in the middle ear easier and more effective. However, normal Eustachian tube function does not guarantee that a young diver will reliably perform a Valsalva manoeuvre. [1, 4].

One of the most common medical conditions in childhood is asthma. This serious lung disorder has reached epidemic proportions to children and it is a major concern—and long subject of controversy—within the diving community [1]. There is an argument that asthma may put a child at an increased risk of pulmonary barotrauma and other life-threatening complications. As Mitchell [3] suggests, children with a history of asthma should refrain from diving activities until puberty.

At an age when children are eligible for an Open Water diving course, they should have their medical fitness re-evaluated by a dive physician. Similar attention is required when a child suffers from hay fever, since this illness may predispose them to aural and sinus barotrauma.

Psychological differences. Medical and physiological factors are vital factors and need to be thoroughly considered before a child attends a diving course.

However, psychological and

Children practice underwater skills, guided by an instructor, in a PADI Seal Team course with Kids Scuba near Kuala Lumpur

behavioral issues are also important. They determine how a child will learn and gain skills, as well as the quality of their social interaction and emotional development. Sometimes, physical growth does not equate with emotional maturity. Psychosocial and cognitive factors need to be accessed during the child's dive training process [3].

Medical statement

Divers Alert Network (DAN) conducted a search of 4,600 biomedical journals going back to 1966 in an attempt to locate studies on how the physiological differences between adults and otherwise healthy children alter the child's capability and risks associated with diving. The Medline database revealed no papers dealing with this issue. Therefore, DAN concluded, "any recommendations made would be based on theoretical considerations taking into account what is known about normal growth and development, and the empirical evidence that exists where children younger than 12 have scuba dived".

Main issues to be addressed by DAN [7] are:

• Evidence of increased incidence of Patent Foramen Ovale (PFO) in children: One study was made on the age distribution of PFO. They found an increased incidence of PFO in the 10- to 20-year-old group compared to other groups. However, this incidence was based only on six cases (three with existing PFO) out of a total of 705 cases.

• Susceptibility to oxygen toxicity: Clinical experience suggests no particular difference in susceptibility of children down to age eight to either pulmonary or Central Nervous System (CNS) oxygen toxicity.

• Epiphyseal damage due to DCI: There is no published evidence suggesting that the physis , or growth plate in bones, is more susceptible to decompression sickness (DCS) in children compared to adults. Depth and time restrictions should be imposed by training organizations to increase safety.

• Susceptibility to pulmonary barotrauma: Children at the age of

Children enjoy learning about scuba diving with Hj. Syed Abd Rahman, founder and PADI Master Scuba Diver Trainer of Kids Scuba Malyasia, one of the world's largest children's diving clubs and winner of the PADI Youth Diver Education Award (right); Children practice diving skills in the pool during a PADI Seal Team course with Kids Scuba near Kuala Lumpur (below). For more information, visit: **www.kidsscuba.com**

eight or younger are at a theoretical increased risk of pulmonary barotrauma, because their pulmonary alveoli are still multiplying, pulmonary elasticity is increased, and chest wall compliance increased. It is strongly recommended that children younger than eight should not scuba dive.

• Are children more likely to have an asthma episode while diving? Cold conditions, physical exertion, salt-water aspiration, and panic due to an asthma attack when underwater are risk factors. However, there is no sufficient evidence to accept or reject these hypotheses.

• Susceptibility to ear barotrauma: Due to the physiological characteristics of the Eustachian tubes in children (see above), ear infections and barotraumas are common in diving based on a study conducted by Dr Guy Vandenhoven [6].

• Exposure to cold environment: As previously noted, children will cool faster in the water. They should not become hypothermic underwater. Proper thermal protection and hydration before, during and after diving minimize the likelihood of hypothermia.

• Susceptibility to venous gas emboli (VGE) and DCS: No published data on the post-dive VGE incidence and DCS occurrence in children compared to adults is available. In addition, if children get DCS, the severity level of their injury compared to adults had not been ascertained. Depth and time restrictions should be introduced by training organizations to enhance safety.

• Physical ability to cope with emergencies: As mentioned before, children have less strength and stamina than adults do. In addition, they present with characteristic behavioral responses, including evidence of anxiety or panic. However, appropriate human factor studies have not been carried out.

Epidemiology of diving incidents/accidents in youths

DAN collected data on 1,248 diving fatalities for the years 1989-2002. Twenty-four (1.9 percent) deaths involved divers 17 years of age or younger (range 10-17). Every case was determined to be an accidental death. Drowning and/or air embolism was the cause of death in the vast majority of mishaps. It is important to note that several of the young divers lacked formal diving training and many died while performing a high-risk dive profile. Most of these deaths were accidental in nature and theoretically could be avoidable if diving was conducted safely [2].

CMAS has run youth diving programs for years and now has records of close to a million exposures without serious injury. In addition, PADI issued 122,298 Junior Open Water (JOW) certifications between 1988 and 1998, and is aware of only one fatal accident involving a JOW diver [4].

Finally, Vandenhoven [6] et al., conducted a study of 234 children divers (ages 6-13) with a follow-up of eight years. They did not record any significant incident in 2,216 dives in the sea and recorded only one case of hypoxic syncope during breath-hold diving and some other minor otolaryngological issues during the course and the dives, all with complete recovery.

Conclusion

Children's physical, physiological, pathophysiological and psychological characteristics influence their performance during diving. In light of this fact, children should not be considered as small adults. It is essential that education and training must be focused and adapted to the individual child.

As the number of children below the age of 12 increases, more empirical and clinical data will be gathered and our understanding of children's capacity during diving will further increase.

Children and scuba diving is a controversial topic where there is no absolute truth. This magnifies even more the need that parents, doctors and diving instructors show common sense and extreme caution. ■

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Edited by
Catherine
GS Lim

Photos courtesy of Hj. Syed Abd Rahman and Kids Scuba Malaysia

Kids Scuba Holds Day for Sharing

Every spring, Kids Scuba, a PADI 5-star dive center in Malaysia, hosts an event to share the underwater experience with children and teenagers from orphanages in Kuala Lumpur. The event was held this year at the Maybank Training Academy swimming pool in Bangi, about 30 minutes from Kuala Lumpur.

Kids Scuba hosted 46 underprivileged kids and teenagers from two orphanage homes for a one-day pool experience entitled "A Day for Sharing". Included in the Discover Scuba program was education about the marine environment, basic swimming and snorkelling skills, as well as an opportunity to discover the thrills of scuba diving.

PADI Master Scuba Diver Trainer and founder of Kids Scuba, Hj. Syed Abd Rahman, started the day off by introducing the Kids Scuba Team and instructors to the participants and teachers attending the program. Everyone was then treated to a local breakfast, before the participants were divided into four groups.

During the four-hour program, the four groups were rotated amongst the activities, so everyone had a chance to learn and enjoy all the different skills. During lunch, there were lots of smiling faces as participants shared their underwater experiences with each other.

The "A Day for Sharing" pool program ended with a group photo session and the presentation of certificates. Participating children and teenagers also received backpacks full of basic school necessities, while the teachers and coordinators from each home were presented with gifts for their orphanages, courtesy of Kids Scuba.

After the course, four orphan boys aged 18 to 21 were selected for a special program: the Zero to Hero program by PADI, which gives participants training from the open water course to divemaster certification level. As part of this intensive program, there were weekly confined water sessions in the pool, in which the boys—Fadhel, Shakir Ashraff, Daniel and Kamal—were trained by the Kids Scuba team under the direct supervision of Hj. Syed Abd Rahman. Then, with PADI's support, the boys sat and completed their knowledge review, quiz and exam before going on their island trip to Tioman at the end of March 2015.

During the open water component of the course, the boys dived with the Kids Scuba team and B & J Diving Center, a PADI 5-Star, IDC center in Kg Salang on Tioman. The boys took part in shore and jetty dives at the Salang Jetty. This was followed by boat dives to Soyak and Renggis Islands in the Tioman Island Marine Park, assisted by divermaster Khairul Azizi.

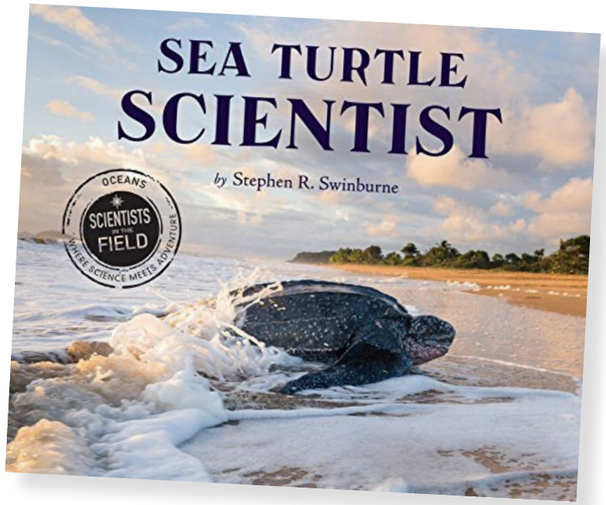
At the end of the 3-day and 2-night dive trip, the final evening saw the boys graduate with their PADI Open Water certificates and receive their temporary certification cards after successfully completing the PADI Open Water Diver course. The boys' next dive trip was conducted at Tenggol Island in Terengganu where they continued their training in the Advanced Open Water Course. ■

THIS PAGE: Scenes from Kids Scuba "A Day for Sharing" in Kuala Lumpur, Malaysia

PADI Master Scuba Diver Trainer and founder of Kids Scuba, Hj. Syed Abd Rahman, talks with children about diving and the marine environment (above); Rahman with four boys graduating with Open Water Certifications (left inset); Day for Sharing participants (below)

media

Books for kids!

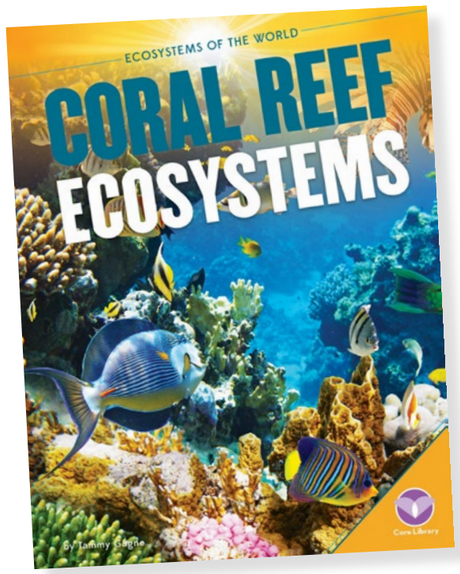


Sea Turtles

Sea Turtle Scientist, by Stephen R. Swinburne.

Have you ever seen leatherback turtles going ashore to lay eggs in the middle of the night? Do you know that out of 1,000 turtle eggs laid on a beach, chances are that only one would hatch a turtle that would survive and grow up to became an adult leatherback. In this new book, learn more about these turtles and how they came to be endangered, as well as what scientists are doing to save them.

Age Range: 10 - 12 years
Series: Scientists in the Field Series
Paperback: 80 pages
Publisher: HMH Books for Young Readers
Date: 1 September 2015
ISBN-10: 0544582403
ISBN-13: 978-0544582408



Coral Reefs

Coral Reef Ecosystems, by Tammy Gagne.

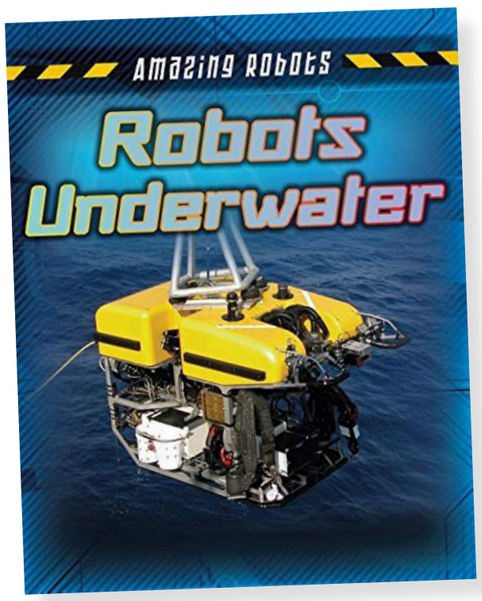
This book starts with Courtney taking her first scuba dive in the Florida Keys. Over the course of the book, the characteristics, food webs and different types of coral reefs are described, as well as the plants and animals that live within the reef ecosystem. Our impact on the reefs is also examined, as well as our subsequent efforts to conserve them.

Series: Ecosystems of the World
Library Binding: 48 pages
Publisher: Core Library
Date: September 2015
ISBN-10: 1624038522
ISBN-13: 978-1624038525

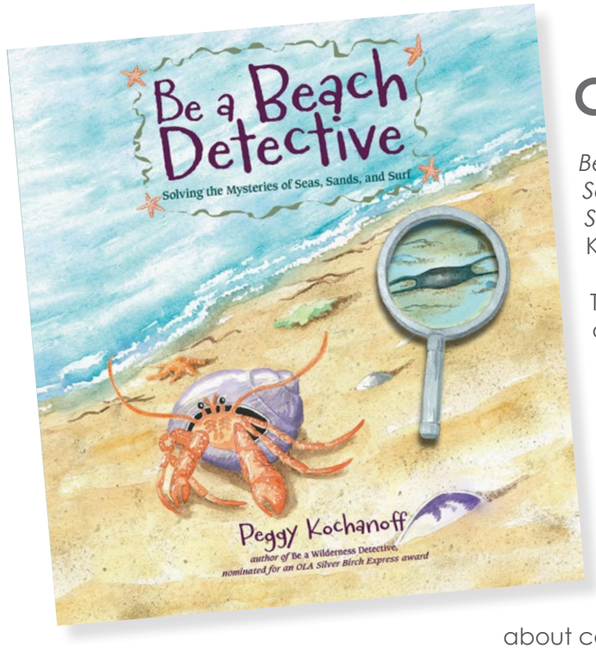
Submersibles

Robots Underwater, by Louise Spilsbury and Richard Spilsbury.

These days, robots are often used in underwater exploration. They are indispensible in mapping the ocean floor, testing water quality and have even been used to explore the shipwreck of the *Titanic*. This book examines the technology of these machines and the many ways they are used in everyday life. Related information about robotics engineers and environmental issues are also covered. This book also contains full-colour photographs and informational sidebars to complement the main content.



Series: Amazing Robots
Library Binding: 48 pages
Publisher: Gareth Stevens Publishing
Date: 1 August 2015
ISBN-10: 1482430215
ISBN-13: 978-1482430219



Curiousity

Be a Beach Detective: Solving the Mysteries of Seas, Sands, and Surf, by Peggy Kochanoff.

The next time you head for a day at the beach, bring along this book. It contains answers to some questions that may arise during your trip; questions such as: Can dead jellyfish sting? Can anything eat those prickly sea urchins? Full of fascinating facts and surprising solutions, this illustrated book also tells you more about coastal habitats and the animals that live there.

Age Range: 4 - 9 years
Paperback: 40 pages
Publisher: Nimbus Publishing
Date: 1 September 2015
ISBN-10: 1771082674
ISBN-13: 978-1771082679

media

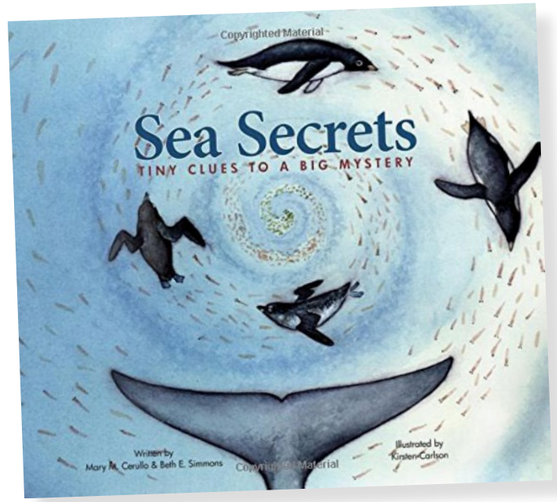
Books for kids!

Reef Mystery

The Mystery at the Coral Reef (Greetings from Somewhere), by Harper Paris and illustrated by Marcos Calo.

In the 8th book of the Greetings From Somewhere series, eight-year-old twins Ethan and Ella are in Australia, where they visit their cousin's beach house. Before long, they stumble across a ticking watch, and then hear reports of fishermen illegally taking coral from the nearby reefs. What's going on? Are they related? Targeted at readers aged five to nine years old, this story is written in easy-to-read language and contains illustrations on almost every page.

Age Range: 5 - 9 years
Series: Greetings from Somewhere (Book 8)
Paperback: 128 pages
Publisher: Little Simon
Date: 21 July 2015
ISBN-10: 1481423703
ISBN-13: 978-1481423700



Sea Secrets

Sea Secrets: Tiny Clues to a Big Mystery (Long Term Ecological Research), by Mary M. Cerullo and Beth E. Simmons and illustrated by Kirsten Carlson.

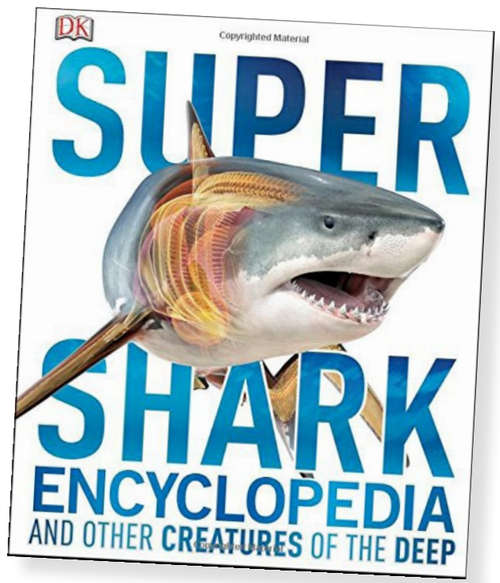
What does a seabird, whale and penguin have in common? Read this book to fearn the sea secret that links these three animals to one another. In addition, you can also find out about two ocean ecosystems and their food webs as well. This educational journey has field sketches, watercolour illustrations and photographs that help to illustrate the various concepts and research. Simply a fun introduction into the world of science exploration, fieldwork and ocean discovery!

Age Range: 6 - 10 years
Series: Long Term Ecological Research
Paperback: 32 pages
Publisher: Taylor Trade Publishing
Date: 25 April 2015
ISBN-10: 1630760757
ISBN-13: 978-1630760755

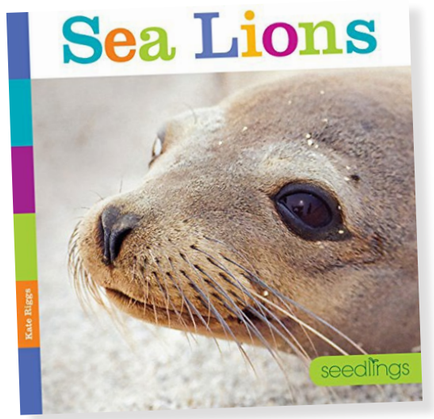
Shark Encyclopedia

Super Shark Encyclopedia, by DK.

Eighty sharks and other sea creatures are featured in this lively guide. Packed with hundreds of fascinating facts about shark behaviour and anatomy, readers will also learn why the shark is one of the world's most efficient predators. The many illustrations and photographs help make learning bite-size and effortless..



Age Range: 8 - 12 years
Hardcover: 208 pages
Publisher: DK Children
Date: 2 June 2015
ISBN-10: 1465435840
ISBN-13: 978-1465435842

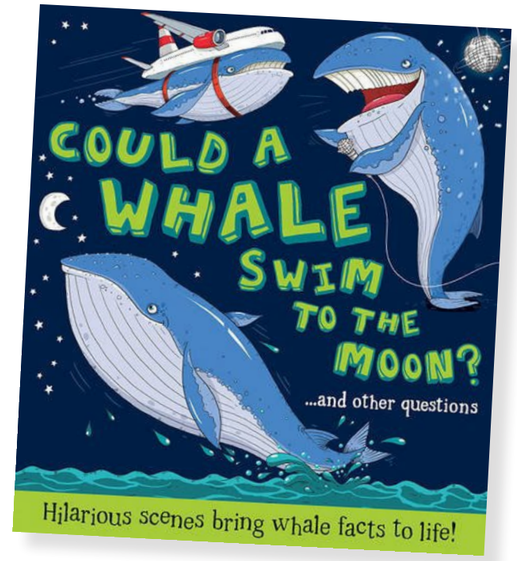


Sea Lions

Seedlings: Sea Lions, by Kate Riggs.

Kids at the kindergartens can also learn about ocean animals,,with this elementary book on sea lions. This book introduces the sea lion's behaviour and growth process as well as their defining features like flippers and whiskers. An ideal book to start the kids off on their learning journey about our marine animals!

Age Range: 4 - 6 years
Series: Seedlings
Paperback: 24 pages
Publisher: Creative Paperbacks
Date: 15 September 2015
ISBN-10: 1628321164
ISBN-13: 978-1628321166



Whales

Could a Whale Swim to the Moon? by Camilla de le Bedoyere, illustrated by Aleksei Bitskoff.

If only schoolbooks were this fun to read! While this book contains factual information about blue whales, the information is presented in a question-and-answer format that makes it easy to learn and remember the facts. Plus, the illustrations are funny and 'relevant' – for instance, because blue whales have the biggest heart in the animal world, one of the illustrations shows a blue whale making a giant valentine's card.

Age Range: 3 - 5 years
Hardcover: 24 pages
Publisher: QEB Publishing
Date: 3 August 2015
ISBN-10: 1609927729
ISBN-13: 978-1609927721

JILL HEINERTH

Insights into Cave Diving

Lamar Hires

— *Founder & Owner of Dive Rite*

Text by Rosemary E. Lunn
Photos courtesy of Jason Brown, Jill Heinerth, Lamar Hires, Rosemary E. Lunn, John McCain

In 1979, Lamar Hires was 23, living in Jacksonville, on the east coast of the US state of Florida, and harboring a dream from his childhood. As a child, his family had taken him to the Florida Keys and he had subsequently grown up watching television shows such as *Sea Hunt, Voyage to the Bottom of the Sea* and *Flipper*. The adventure of scuba excited him and he wanted to learn to dive.

Hires' roommate at the time, Mike Chapman, also wanted to take up diving. They quickly buddied up and did their Basic IDEA (International Diving Educators Association) Scuba Diver qualification at the American Dive Center in Jacksonville.

Back then, there weren't any dive boats going out of Jacksonville, said Hires, and the nearest dive destination was five hours away in West Palm Beach. He was not fond of diving off a boat, because he suffered from sea sickness, but Hires and Chapman were eager to get in the water as much as possible.

While rooting around the American Dive Center one day, the two came across Ned DeLoach's, *Diving Guide to Underwater Florida*. This book gave directions and descriptions to several spots in Florida that many people didn't know, covering a multitude of freshwater springs, wrecks and reefs.

Hires said they were very happy to discover that the springs of North Central Florida were less than a two-hour drive away. This was an ideal solution for them. At the time, Hires was doing shift work at a chemical plant as an operator running distillation columns and reactors. So, Hires and Chapman started going over on their days off—diving midweek—when there weren't many divers around.

They soon realized that North Florida was riddled with flooded caves and springs. In fact, the Suwannee River watershed had some 253 identified springs, said Hires, the highest density of springs on the planet, and it didn't take long for the dive buddies to start checking off many of these dive sites.

Hires' first cave exploration dive was in one of them in 1979. He and Chapman came across Rock Bluff Springs while waterskiing on the Suwannee River. They went in as far as they could, using their only light to show them the way out. As you can guess by this dive description, some of their dives were unorthodox and not without incident. They had a few "safe" diving accident dives. Looking back on these dives, Hires said he didn't think anything of it at the time, because they always made it out. At age 23, he said, you do believe you are immortal.

Meeting Wes Skiles

One fateful day, Hires and Chapman decided to stop at Pro Dive in Jacksonville to get their cylinders filled, simply because it was closer to their apartment complex than the shop where they got trained. It was on this day that they met Wes Skiles.

Skiles was working on the compressor when the two arrived and "it took forever to get our tanks filled," said Hires. In fact, it took such a long time that Skiles didn't charge them for the air fills. That gesture earned Pro Dive two new customers, said Hires, as the buddies started going

COURTESY OF LAMAR HIRES

Hires in dive gear in 1982; Early days, Hires discovers the value of a shovel when exploring Rock Bluff Springs (right)

there for all their air fills and diving needs.

"Maybe next time"

Months passed and the dive buddies would often talk to Skiles about their diving and what they were doing. One visit proved to be a turning point. Hires said he will never forget the day he and Chapman told Skiles that they were going back to Peacock to check out the cave system.

Skiles was very quiet, said Hires, then he pulled a book off the shelf and gave it to the pair. It was Sheck Exley's book, *Basic Cave Diving*, originally published in May 1979. Hires saw that it cost US$5 and said, "Maybe next time." He and Chapman had just paid for air fills and needed fuel and beer money, so he added, "Next time we are in." Hires said Skiles looked at the two and said, "Read it. I'll give it to you, if you read it."

Chapman was driving that day, said Hires, so he started reading it out loud:

"Accident Report: On May 7, 1978, two young sailors from a nearby naval base arrived at Royal Springs. Neither Jim nor Mike had any training in basic scuba diving, much less cave diving, and had only been cave diving a couple of times previously. They entered the water without a line, and Jim did not have a light or submersible air pressure gauge.

"After quite some time had passed and the two had not surfaced, a friend became alarmed. The Sheriffs Department was contacted, who in turn called our NSS recover team. NSS divers quickly found Jim 53m (175ft) back in a small, silty cave at a depth of 9m (30ft), and Mike's body was found some 68.5m (225ft) further. There was no air in their tanks."

Read it. I'll give it to you, if you read it.

Hires and Chapman had done one of the dives in the book where the divers died (Royal Springs) and one where divers had barely made it out with air in their tanks (Orange Grove Sink). That was a revelation, said Hires, that one could actually die going into overhead environments at the springs.

At the back of the book, Hires found Exley's *Blueprint for Survival*, which listed his ten recommendations for safe cave diving:

1) Always use a single, continuous guideline from the entrance of the cave throughout the dive.

2) Always use the 'third rule' in planning your air supply.

3) Avoid deep diving in caves.

4) Avoid panic by building up experience slowly and being prepared for emergencies.

5) Always use at least three lights per diver.

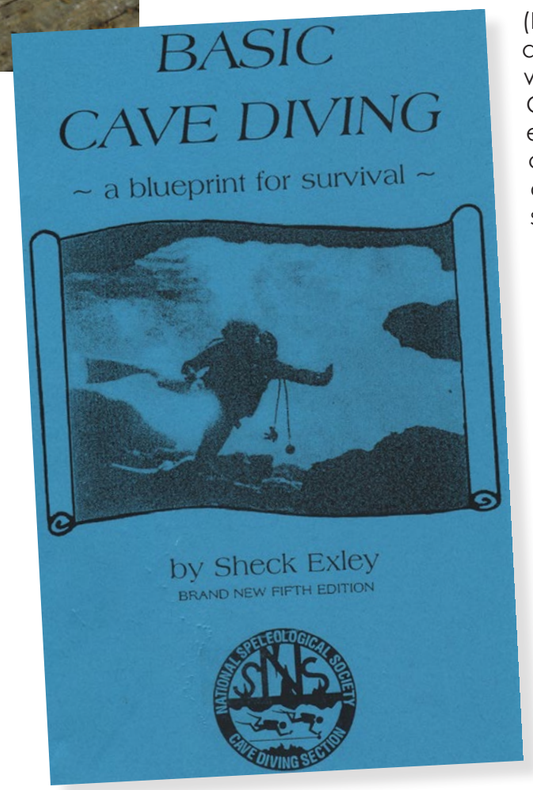
6) Always carry the safest possible scuba.

7) Avoid stirring up the silt.

8) Practice emergency procedures with your partner before going diving, and review them often.

9) Always carry the equipment necessary for handling emergencies, and review them often.

10) Never permit overconfidence to allow you to rationalise violating safety procedures.



Sheck Exley's *iconic safety text for cave diving*

The following week, Hires and Chapman returned to Pro Dive Center (it later became Aquifer Dive Center), sought out Skiles and said: "You have our attention. Where do we go from here?"

Skiles was an active, passionate Open Water instructor, cave diver and cave instructor, said Hires. It was his enthusiasm that encouraged Hires to take the path he did. Both Hires and Chapman completed their PADI Advanced Open Water course with Skiles and went on to do their cave training with him. Skiles had taught many cavern classes, but Hires said, he believes he and Chapman were his first two full cave students. "It was not your normal class," said Hires. "He was not just teaching us, but mentoring us to be his dive buddies."

You have our attention. Where do we go from here?"

A lot of digging

Following their cave certification, Hires and Chapman decided that a return visit to Rock Bluff Springs was in order. It was 1981. They discovered this cave required a lot of digging and that a shovel was an essential exploration tool.

"We dug through a restriction at 60m (200ft) from the entrance where Sheck Exley's line stopped," said Hires. Exley had surveyed this cave with Paul DeLoach in January 1979.

Chapman stayed behind as Hires went through and explored around the corner to see if it continued. Hires described it as "exhilarating", having what open water divers would describe as "a strong current".

In cave diving terminology, water movement is described as "flow", said Hires. Rock Bluff Springs is a high flow cave, he added. Hires got stuck coming back out through the restriction, as the entrance was very tight for back-mounted cylinders, and Chapman had to pull him clear through the restriction they had dug out earlier.

Leaving a shovel

Hires and Chapman quickly learned that leaving a shovel inside the cave mouth was a good idea, because they would often have to remove sediment that periodically choked up the opening. They would return to this cave many times in 1981, as Skiles, Hires, Chapman and Woody Jasper explored and surveyed over 1,200m (4,000ft) of virgin cave.

"You never forget your first kiss, car or set of diving equipment," said Hires. "When I was diving Rock Bluff, I wasn't in the mindset to figure out the gear; I just dived what I had." His first scuba set was a Cressi jacket-style BC with a Dacor Pacer 300 regulator. There

COURTESY OF LAMAR HIRES

COURTESY OF LAMAR HIRES

Hires cave diving at Little River Springs; Cave divers at Wes Skiles Peacock Springs State Park, Florida, USA (right)

Lamar Hires

divers get creative and clever with their hands.

Florida's ideal conditions are the epitome of what all cave divers would like to experience, he said, and, as a direct result of advantageous conditions, tremendous attention has been paid to the design and evolution of optimum equipment.

At the time, Hires did not know that an invention by Greg Flanagan two years earlier, in 1979, would have a positive impact on his future diving and his career.

Birth of the backplate

Flanagan was a college student at the University of Florida, said Hires. After experiencing the unwieldy "belly bags" combined with a jacket-style BCD during his cave training with Sheck Exley, Hires said Flanagan developed the first metal backplate from a "liberated" aluminum "Stop" road sign and some webbing off a US Navy harness. The design Flanagan created remains relatively unchanged today. Flanagan's new back-mounted BC worked wonders, said Hires, and he soon became the envy of his cave classmates.

Flanagan was asked to create backplates for his fellow students as well as old timers such as Sheck Exley, Will Walters, Dale Sweet, Steve Straatsma and Tex Chalkley, said Hires. However, it was Flanagan's cave diving buddy, Bill "Hogarth" Main, through his relentless pursuit of cave diving, who made the backplate and harness a foundational component of what is now called the "Hogarthian Rig", said Hires. Dive Rite was the first company to commercially manufacturer the backplate in 1984, he added.

Beginnings of sidemount

Skiles, Jasper and Hires began to realize that there were two types of caves to explore. There were the big caves like Manatee Springs and Cathedral Canyon Spring where they would be competing with the likes of Sheck Exley for the end of the line. Or they could start exploring the caves, or "scraps", that these pros did not explore. But the scraps really told the true story of the Floridian Aquifer-karst, said Hires, plane by karst plane. And that is when Hires and his colleagues began playing with sidemount.

Mike Boon, a British diver, started sidemounting in 1962, said Hires. At the time, a number of British divers, including cavers, favored a small cylinder that they christened a "tadpole". This 3-liter (26 cu ft) tank was filled to 124bar (1,800psi). The Brits would scour military surplus shops for them, Hires said. Originally, tadpoles provided air crew on Lancaster Bombers with oxygen when they flew at higher altitudes.

Brit sidemount

The British style of diving was a starting point, said Hires, but his team had different criteria. The British setup really did not involve that much diving, he said. It was designed for crawling through tight dry bedding plains, climbing up rock piles and down gullies. It needed to cope with the caver climbing up or down sheer drops and vertical walls using ladders and lifelines. (SRTing or single rope technique didn't come into being in the United Kingdom until 1974). Finally, the caver would reach a flooded muddy sump that they would dive through to reach the next dry cave and resume their exploration. Therefore, the British setup needed to perform in both dry and wet cave systems, Hires said.

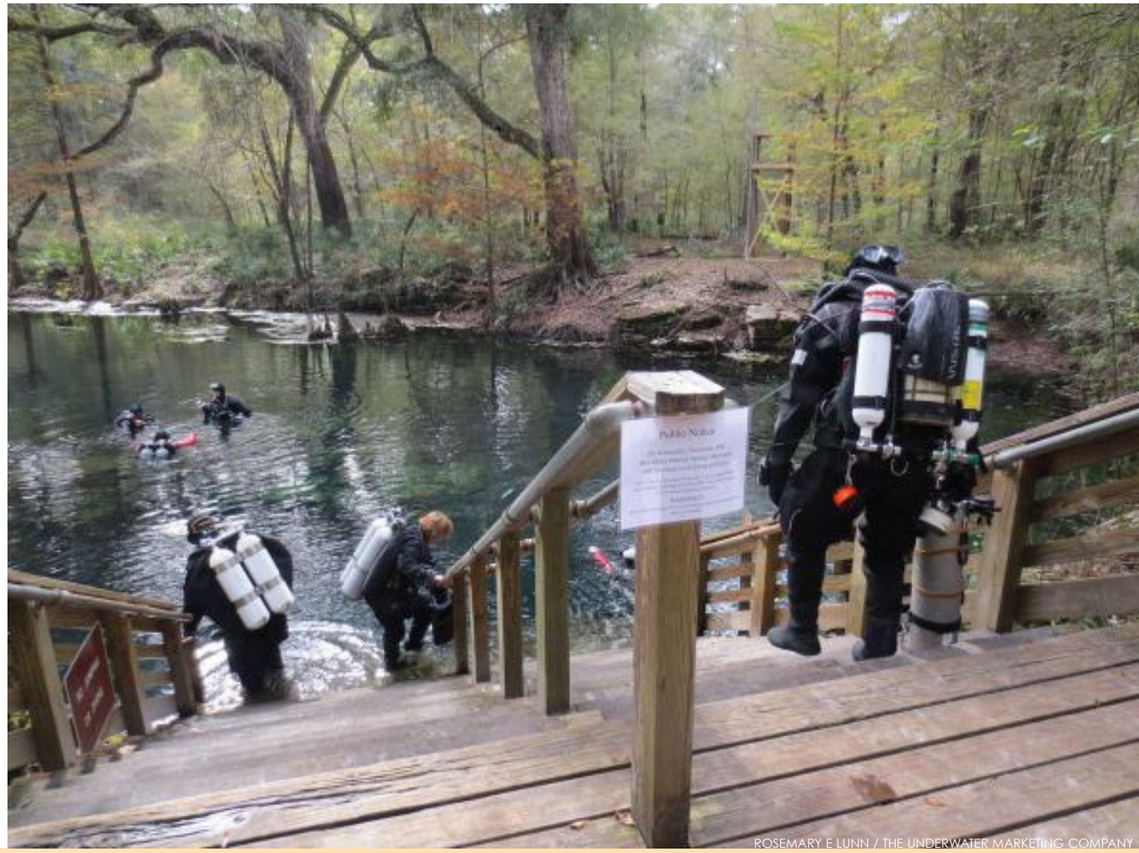
Visibility forever

On the contrary, Hires and his buddies were diving "the blue ether of another world", just a few steps from where they parked the truck. These were stunning, fully-flooded cave systems, he said, with "visibility forever", which were so wondrous that many considered Florida to be the cave diving capital of the world.

Hires said that the passageways often had high flow and small places to negotiate, and they were usually full of clear water. The team wanted to keep it that way. "These were no muddy squalid sumps," he said. "These were crystal clear flowing springs. Some were flowing so hard we could not swim against them—we had to pull our way in."

By now, Hires was using a Tabata jacket-style BCD, augmenting with an Ocean Dynamics wing. This wing had been designed to be dived with a single tank. But the combination didn't make for an optimal solution, he said. His jacket struggled to cope with carrying his back gas in heavy double 104's (approximately an 18-liter twinset). Hires added the wing because he required additional lift to dive his stages, for which he was using steel 72's (heavier than Ali 80's).

It was painfully obvious to the team, said Hires, that they needed equipment that was not being manufactured on a commercial basis. So Skiles, Jasper and Hires worked together as fellow crash



ROSEMARY E LUNN / THE UNDERWATER MARKETING COMPANY

was no octopus back then, he said.

Having a second regulator was still being debated in the open water community, said Hires. Instruction in the use of an alternate air source was not mandatory in all PADI courses until September 1986. The Dacor Pacer 300 became his second regulator when he started cave diving, and he purchased a Sherwood Magnum to serve as his primary regulator. This would later be upgraded to a Poseidon for deep air dives, said Hires.

Kit not up to snuff

Hires and Chapman soon found the kit was not matching the challenges cave exploration was throwing up for them. When that happens, said Hires, cave

Lamar Hires

test dummies in a team effort to develop and refine the gear and techniques to get them where they are today.

Grandfather of sidemount

It would be fair to say that Woody Jasper was the grandfather, or inventor, of the Florida-style sidemount rigs as we currently know them, said Hires. Jasper had been diving double 72 cu ft cylinders when he got wedged in the back of Bathtub Spring off the Suwannee River. Then, the lights went out, said Hires. The switch on Jasper's butt-mounted light had been bumped off as he squeezed sideways through a tight spot in the cave, and he couldn't reach his backup lights.

It was the words of Harry Houdini that helped him wriggle his way out said Hires: "There's always some slack somewhere." As Jasper drove home that night, the first of many sidemounted rigs began to take shape in his head, said Hires.

"Jasper was the first to realize that we needed to pull the neck of the cylinder in tight, snug into the armpit to get through the really tight places," said Hires. "Woody used a bicycle inner tube across his back to pull the tanks in tight. Today, we use bungee to do the same thing."


COURTESY OF LAMAR HIRES

Hires and Wes Skiles going diving in 1983

Trial and error

The team put everything to the test and constantly refined it as they hit problem after problem, said Hires. They often had eureka moments, only to find out that "as soon as you applied water and took the system diving, it didn't work so well." Hires said that there was lots of development work in the early '80s as sidemount evolved into a tool for exploring flooded Florida.

Narrow escapes

There were many narrow escapes as the team pioneered dive gear development, according to Hires, during which he experienced some of his most memorable cave dives. "These close calls—and I have had a number of them—never really rattled me," he said. "They were all learning experiences."

I find it fascinating that divers often don't give a second thought about how the equipment they dive today came into being.

His most memorable tense dive was with Jasper at a place called Creature Sink, in the late '80s. It was one of the smallest sidemount caves he had been in with flow, said Hires. It had a lot of silt, the kind that followed divers out because of the flow.

Their mission was to dig out the back and see if the cave continued. When they decided to give up and go back, their return was filled with silt. "We then did what was the slowest most technical exit I had ever done in low to zero visibility," said Hires.

The test experiences got Hires thinking. "I find it fascinating that divers often don't give a second thought about how the equipment they dive today came into being. They have no concept of the dives and mishaps that took place that directly shaped the gear we currently have."

Hires said he feels that there is always room to improve dive kit and gets a real kick out of solving problems that people don't realize they have—a zeal that continues to drive Dive Rite's success.

Into the dive business

By the fall of 1982, Hires decided to change jobs and get into the dive business. He went to work

COURTESY OF LAMAR HIRES

Hires in Jug Hole at Ichetucknee Springs State Park in Fort White, Florida, USA, 1985

Lamar Hires

with Wes Skiles, who had moved to the heart of North Florida cave country two years earlier, to manage the Branford Dive Center (BDC), located next to the Suwannee River. Because BDC was the only real training and equipment center for cave diving in the area, it was the right place to work and the best way to hear about who was diving with whom and where, said Hires.

No reels, no wings in 1982

At the time, the lead cavern and cave instructor at BDC was Mark Leonard, said Hires. Leonard started making reels in his garage because cave divers needed reels to comply with cave training standards. Hires said that it might sound implausible today, but in 1982, "no one was commercially manufacturing reels in cave country... or wings... or backplates."

Hires was always looking to improve himself and the gear he used. Skiles saw this, and in 1983, asked Hires to take potential cave instructors on dives that encouraged them to push their personal limits, including exploration. He soon found out that mentoring was important.

Triple drowning

But in the summer of 1983, the tables were turned, and Hires received some mentoring he wasn't expecting.

On June 13, three men came into BDC to get their tanks filled. They were all in their mid-thirties, said Hires. None of them were certified divers, although Hires didn't know it at the time.

The next morning, reports reached BDC about a triple drowning at Royal Springs. The shop staff—who were all local divers—were asked to help, said Hires. The team included Leonard, Skiles, Gene Broome (the owner of BDC) and Hires.

"I had butterflies that morning because I didn't know what to expect," said Hires. "What had I got myself into?" He had never seen a dead body, except at a funeral. Hires knew the victims; he had filled their tanks and sold them a few accessories the day before.

Hires said the team found them in three different places at 23m (75ft), 46m (150ft) and 61m (200ft) into the cave. There was no line, no reel and they were all diving single 80 cylinders (approximately 11-liter cylinders). They had one light each. All were found with no air in their tanks, he said.

"This event changed the way I thought about training and community service," said Hires. "I lived here. This was my home. I wanted to make a difference."

A flood motivated Hires to act. In the spring of 1984, the second largest flood known to occur on the Suwannee River in Lafayette County took place. Hires and Leonard decided it was time to start selling gear to other shops.

They knew that cave diving did not only take place in North Florida, and they saw that there were more instructors coming online at dive shops that wanted to sell direct to their students, rather than let Branford Dive Center get all the sales. There were at least 20 shops ready to buy on the East Coast. It was time to leave BDC, said Hires.

We had a very simple rule when we started Dive Rite: We were divers first. We therefore set out to build gear the way we needed the gear to be.

Starting Dive Rite

In May 1984, Leonard and Hires started Dive Rite. Before Leonard moved to North Florida, he had run a dive shop called Dive Rite in Speedway, Indiana. "We both liked the name," said Hires. "It explained what we manufactured perfectly in two words." Hires and Leonard split the jobs up: Leonard handled manufacturing while Hires managed sales and education.

"We had a very simple rule when we started Dive Rite," said Hires. "We were divers first. We, therefore, set out to build gear the way we needed the gear to be."

Everything was tested in the field for a specific mission or expedition, to further divers' ability to explore, said Hires. And because gear was designed to "go where no one has gone before" (yes Hires is a Trekkie), the two made sure the gear was built for the adventure—and built to last.

"Personally, I smile when I see an older piece of Dive Rite equipment in the field," said Hires. "I really just want to tell the diver we have something better now—something that is more comfortable and will do the dives you might not have thought of doing yet."

Products and certifications

Dive Rite's first products included a backplate, harness, primary reel, safety reel, jump reel, primary canister light, hardware (clips, D-rings and slides), a slate and lead weights, said Hires.

In August 1984, Hires got certified as a NAUI Open Water Instructor. His examiner was Jeff Bozanic. "Today, everyone thinks of Jeff as being a rebreather guru," said Hires. "He and I think of him as a cave diver; that's where he started."

Hires was not the typical NAUI instructor, however. By the time he qualified, he had already been involved in a number of body recovery operations, and had usually met the victims before their demise. For this reason, he is very passionate about training and education.

In November 1984, Hires became a NSS-CDS cave instructor. This was highly unusual, but then, he had already logged over 500 cave dives, which included exploration.


COURTESY OF LAMAR HIRES

Hires in Azure Blue Cave, Florida, USA, 1983

COURTESY OF LAMAR HIRES

Hires cave diving in 1989

Lamar Hires

"My exploration cave dives proved invaluable when I worked on one of our earliest products: the Dive Rite Classic Wing," said Hires. In 1984, the only wing available was a Seatec or Ocean Dynamics single wing with 35lbs of lift that cave divers used for additional buoyancy, said Hires. He knew from his own personal equipment struggles that there was a real need for a proper "grown up" wing with decent buoyancy or lift that could cope with exploration twinset or doubles diving.

Hires' BCD jacket had about 30lbs of lift and the Ocean Dynamics wing had about 35lbs of lift. Dive Rite's challenge was balancing size and lift. Hires said they figured that 60lbs would work. In 1985, the first tech wing —the Dive Rite "doubles only" 60lb wing—was launched. Today, 30 years later, this is a recognized standard size and many manufacturers produce a 60lb wing.

Bitten by the bug

"At key points in your life, you discover to your utter frustration that you are either too young or too old," said Hires. "I was and am blessed by being part of an emerging aspect of diving: cave diving. Unfortunately, I was too late for the exploration of the more popular cave diving spots in North Central Florida." But that didn't stop him from logging thousands of dives in them.

Hires considers himself an explorer too. Once bitten, one never settles for "just making a dive" he said. Even today, when he goes cave diving, he constantly looks for new passages and thinks about what kind for gear it would take to get through a squeeze between two rocks or a sand slide.

Exploration is his drive, said Hires. The thrill of "on the fly" dive planning is something most divers never get to experience. Hires said his most worrisome dive was in the resurgence of Ellison's Cave at Bluebird Springs in 1985.

Bluebird Springs is located at the bottom of Pigeon Mountain in the US state of Georgia. Having heard that a British caver had dived this spring and observed that the cave ended in a slide and was impassable, Hires and Jasper had to check it out. "We were not going to let a Brit tell us a cave in our backyard ended," said Hires.

The two divers went to Georgia during the annual TAG Cavers event and spent 70 minutes chipping away at a restriction with Jasper's cave tool named "Go Forth". They were able to scrape enough away to get through by "no mounting". Jasper was not only the first in north Florida to sidemount dive, said Hires, he was also known for his propensity to remove his tanks, if that was what was needed, and push them forward, butt-first, like a battering ram through a "no-mount" restriction.

Below the choke

Hires and Jasper cleared a 3m (10ft) long section and surfaced in the bottom of Ellison's Cave. Hires said that no one had been there. They were below the choke that stopped cavers from making it to the sump. "We explored it and then left to tell our friends," said Hires. Word spread quickly and the two divers arranged another trip to dive the cave, while dry cavers went in the top to put dye in the stream to help trace the water as it moved underground. Skiles, Jasper and Hires made up the first team of divers and Jeff Stillo, Luis Menoiuo and Paul Smith made up the second.

The visibility in the basin was low, said Hires, so he ran a reel at the entrance, which was his safety reel. He led the other team in and they explored. They left the cave first. When Hires' team returned to the beach to prepare to leave, he saw the fins of the last member of the other team breaking the surface as he kicked down.

Hires was going to go first, but the line was slack, and the team was worried. Hires said he dropped down to find that the line was broken. It was held in place by a "t" created by a second line joined to the main line the team came in on.

Jasper had added this second line when he went off to check out where he thought the Brit had tried to get through. Hires could see into the restriction and automatically reached back for his reel to remember he had used it at the entrance. He then backed out and promptly got entangled.

Dilemma

Meanwhile Jasper thought Hires was in the restriction and started down. Hires said, Jasper ran into him struggling and helped him clear the entanglement. They then surfaced and Jasper went down to start out and repair the line. In

tech talk

Exley On Mix

Read Sheck Exley's article in X-RAY MAG here >>>

COURTESY OF LAMAR HIRES

Hires in Gator Cave in 1995 (left) and in Cow Springs (below), Florida, USA

Lamar Hires

the low visibility, Hires said Jasper got confused and went down the second line he laid earlier. He returned and surfaced.

Hires said they now had a dilemma. Jasper and Hires were both down to under 100bar (1450psi) in a single steel 72 cu ft cylinder (roughly equivalent of a 9-liter tank) with a 91m (300ft) swim through a small passageway complete with a "no mount restriction". They looked to Skiles and told him he had to go through the restriction, repair the line and return to let them know it was done, said Hires. They did not have the gas to do anything but swim out.

Skiles returned. "We saw his light and as he surfaced he held up a cave pack (tackle bag) with the straps cut. He'd found it in the restriction," said Hires. "All we could imagine was that one of our friends was dead. Then we realized if one was dead, he would be blocking our exit. Not good. We just did not have the gas to deal with it."

Skiles started out. In the meantime the other team made it out. Stillo had broken the line. This stranded Smith, who lost his pack in the restriction, said Hires. The sharp rock cut it away from him. Menoiuo knew the line needed to be repaired, so he went back in and arrived at the restriction at the same time Skiles was grabbing the rock to pull himself free of the restriction, said Hires.

Menoiuo saw a non-moving hand and grabbed it. Skiles freaked and pulled back, said Hires. Menoiuo, now knowing the team was on the move, left the cave. Skiles had a slow exit, wondering where the hand had come from. Hires exited behind Skiles, wondering if he would hit a passage blocked by his friends. Jasper followed. "Everything worked out but it was probably the most intense dive I have ever done," said Hires.

This dive had a profound effect on Hires. He felt it was time he put his knowledge and experience to good use to help train future divers. So in 1987, Hires sat down and wrote the first NSS-CDS sidemount course.

The Hellbender

In 1986, Hires and his team were pushing and surveying a system called Cow Springs. It is a system he said he is quite fond of for a number of reasons and he is proud it became part of his legacy as chairman of the NSS-CDS. (The National Speleological Society Cave Diving Section purchased Cow Springs during Hires Chairmanship, to ensure that the cave community would continue to have access to this superb site.) Cow Springs, which is located near Luraville, is not really a spring at all, said Hires. It is actually an in-line sinkhole that provides diver-access to an underground river, which surfaces for the last time at nearby Running Spring.

Hires said his team had been exploring upstream when they experienced "a heck of a time just getting into the cave proper." It was such torture getting through the first restriction that they soon named this section "The Hellbender".

Although this restriction was only 6m (20ft) deep, it would take the team around 25 minutes just to get five cylinders a piece through it, he said. The flow was so strong that Jasper installed "a poor man's scooter"—which is a heavy polypropylene line or ski rope—in the big section, giving the team something to pull on. It saved time, energy and considerable gas because the divers just couldn't swim this section.

Hires said that Cow Springs was quite a scenic cave, so the team did not want to pull on parts of the cave and destroy it. Today, Jasper's line has been replaced, said Hires, and it runs parallel to the main gold line.

Instant attraction

Hires said that when the team was exploring Cow Springs, he met "a significant lady." During the week, he was working at Dive Rite, and on the weekend, he was teaching classes at Spring Systems Dive Center, later known as Dive Outpost in Live Oak. "One day, this very pretty blonde walked into my Open Water course," he said.

It was July 1986. She was a local girl with a business head on her shoulders, he said. Hires soon discovered that she ran a bicycle shop in Lake City and her name was Lee Ann. The attraction was instant and mutual, he said, but Hires was training her, so he had to remain professional. The course went smoothly, and in August, she was a certified Open Water diver.

And then the team made a

COURTESY OF LAMAR HIRES

JOHN MCCAIN

Peacock Springs is a popular destination for cave divers all over the world and is extensively used to train new cave divers

big discovery at Cow Springs. The team enthusiastically planned to push it again the following weekend, until Hires reminded them it clashed with his first date with Lee Ann.

"We need to postpone this dive a few days," Hires told the team. They smiled and replied, "We are diving with or without you next weekend, Lamar." Hires took a huge risk. He postponed his first date with Lee Ann and went diving.

The following weekend, Hires spent his entire week's wages taking Lee Ann out to dinner. He said he was truly fortunate to find a person who understood just how important cave diving and exploration was to him. "I knew she was a keeper and we married one year later in August 1987," he said.

Sworn to secrecy

The next big project was Telford Springs in 1989. Jasper and Hires were exploring the end of the line at Telford. "It had gotten so small it was ours—you could only sidemount it," said Hires.

At the same time Jasper was also exploring Luraville Springs with a friend, Tom Morris. Jasper was sworn to secrecy; it was the code, not to share exploration until one was ready to publish it, said Hires. "We didn't have Facebook or social media then, so it was easier to keep secrets."

Jasper, Morris and Hires eventually got together to share the survey data collected separately at Telford and Luraville springs. They found that they were only about 30m (100ft) apart. With this revelation, the three decided to enter Luraville Springs.

Hires went first, since the second and third divers were going to have low to zero visibility in the mazes, especially in the 121m (400ft) section called "Woody's Wallow." After exiting the second maze, Hires continued on a north by northwest heading on the compass, regardless of what the passage looked like. The team connected the two caves just 27m (90ft) later.

"It was a short-lived underwater traverse World Record of 2,194.5m (7,200ft), and quickly reclaimed by the Brits," said Hires. "But we aren't competitive."

When Hires first started cave diving the North Florida sites, there was no logistical support there as there is today, he said. Several visiting British divers have remarked that it is almost "red carpet treatment" at the popular springs, said Hires, because a lot of well thought out, robust wooden construction has been put in place, making diving fun, not a chore. There are bespoke built wooden benches for assembling gear and easy kit up, for example. Divers can then walk along flat wooden walkways through the springs, down to large wide wooden steps, before standing on a large stable platform, said Hires.


JOHN MCCAIN

Hires suggested the initiative to establish a main 'gold line' in the North Florida caves

This configuration is ideal for attending to minor details before hitting the water. "One such beautiful spring that has all these site logistics in place is Peacock," said Hires. "It is located near Branford and it's probably Florida's leading killer cave—more than 30 people have died there." Hires said it was no wonder that Skiles had handed him Exley's *Blueprint for Survival*, back in the early days.

In Florida, logistical support has been extended underwater as well. Most caves have a permanent guidelines installed by local cave diving groups, said Hires. The lines are set far back past the entrance so untrained divers will not see them and be tempted to follow. This wasn't always the case, said Hires.

Wrong turn

In September 1989, on Labor Day weekend, a couple went in for a third dive of the day. They were trained cave divers. Tragically light failure led to them to make a very bad decision, said Hires.

What has been frustrating yet fascinating to watch has been the recent explosion in sidemount diving. Especially when I see 'experts' make the same mistakes we did years ago.

At the time, all lines looked the same, he said. The couple ended up taking a wrong turn and dived into the cave instead of out of it. When they realized what they had done, said Hires, the woman bolted further into the cave while the man made it out.

He was devastated, and Hires knew he and his colleagues needed to do something about it. "Usually an accident claims everyone on the team," said Hires. "Having the opportunity to talk to a survivor helps us improve safety."

Hires was then Training Director of the NSS-CDS and thought that color-coding the mainline would be a start to a solution. The board of NSS-CDS supported his idea unanimously and immediately funded replacing the mainline in popular caves with 3mm yellow or gold line to help prevent the Labor Day tragedy from being repeated in the future.

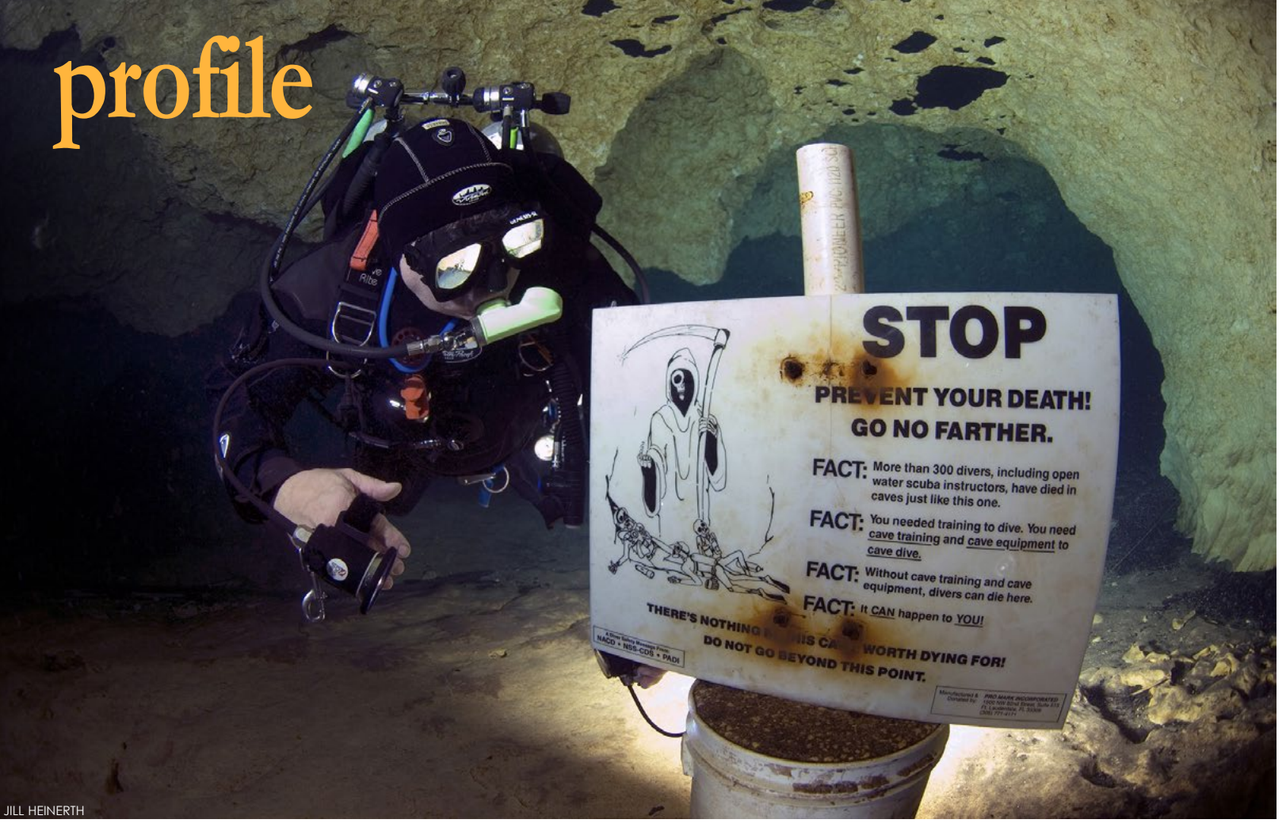
Within a month, Peacock Springs was relined and then work started on the other caves.

Today, this concept has travelled overseas, said Hires. Gold line has been laid in other countries including Australia's Tank Cave. "It is an internationally recognized standard that I am quite proud of," said Hires. "It helps save lives and prevents mistakes."

The growth of sidemount

"What has been frustrating yet fascinating to watch has been the recent explosion in sidemount diving," said Hires. "Especially when I see 'experts' make the same mistakes we did years ago." This includes the great bungee versus the "metal to metal" debate, he added.

All sidemount cylinders should have a metal to metal option for safety on boats and when walking with cylinders attached, said Hires. "Originally we used bicycle inner tube (from Lee Ann's bike shop) across our backs," Hires said. "We found out more than once we needed a safety clip on the neck of the cylinders when



JILL HEINERTH

The cave diving community actively promotes safety at sites throughout Florida warning open water divers not to dive the springs and caves; Hires on a cave expedition in Japan in 1996 (below)

Lamar Hires

the bungee broke, or we lost control of the cylinders."

Hires decided he needed to integrate this safety feature into a practical application. Before sidemount became mainstream, Hires had just a rope loop around the neck of the cylinder to which he could attach a double ender as a safety, for when or if a bungee broke. These days, the arrangement has evolved into the "ring loop bungee system" as an alternative to the classic sidemount bungees, said Hires.

The stage cylinder is rigged with a "choker" holding the top stage clip firmly in place next to the neck of the cylinder. "Then you simply attach this clip to the round metal ring on the ring loop bungee system running beneath your arm, rather than stretching the bungee over the valve," Hires said. "This ring loop bungee system allows the diver to use any cylinder size or choice of thermal protection without having to adjust anything." The diver can then fit this ring loop bungee system to pretty much any harness within a minute, and also with the choker on a stage cylinder.

Hires said that depending on the entry, sometimes one has to get in or out of the water with the sidemount (or stage) cylinders attached. While one may not consider this relevant, it is when diving a cylinder just secured using bungee.

"When we started doing sidemount clinics several years ago, divers would routinely walk out of the water with their cylinders attached," said Hires. "This was disturbing. The divers had been meticulous about taking everything to the water's edge to gear up for the dive; however the same approach was not being used for the exit." Divers were not thinking, he said. Instead they were blithely relying solely on the bungee to hold their heavy steel cylinders in place while walking.

"This is why I am such a big advocate of 'metal to metal' today," said Hires. "This simple attachment method prevents divers from hurting themselves."

There are two other advantages with this system, he said. "The problem with wrapping bungee around a cylinder is that it needs to be a specific length to suit a particular size cylinder," said Hires. "Proper bungee length is determined by diver size, thermal protection and cylinder selection. When traveling you are invariably wearing different thermal protection and you never know what cylinders you will get allocated." Hires said this "double whammy" means that the bungees need to be adjusted accordingly, leading to unnecessary hassle and time.

It is not surprising to Hires that rebreather divers have embraced Dive Rite's ring loop bungee system. "They find it a really simple way of integrating sidemount bailout gas onto their rebreather," he said. "And for those who are concerned about 'metal to metal' in a rescue scenario, we attach the top clip to the cylinder via webbing, so that the stage can be cut away in an emergency."

Planning for self-rescue

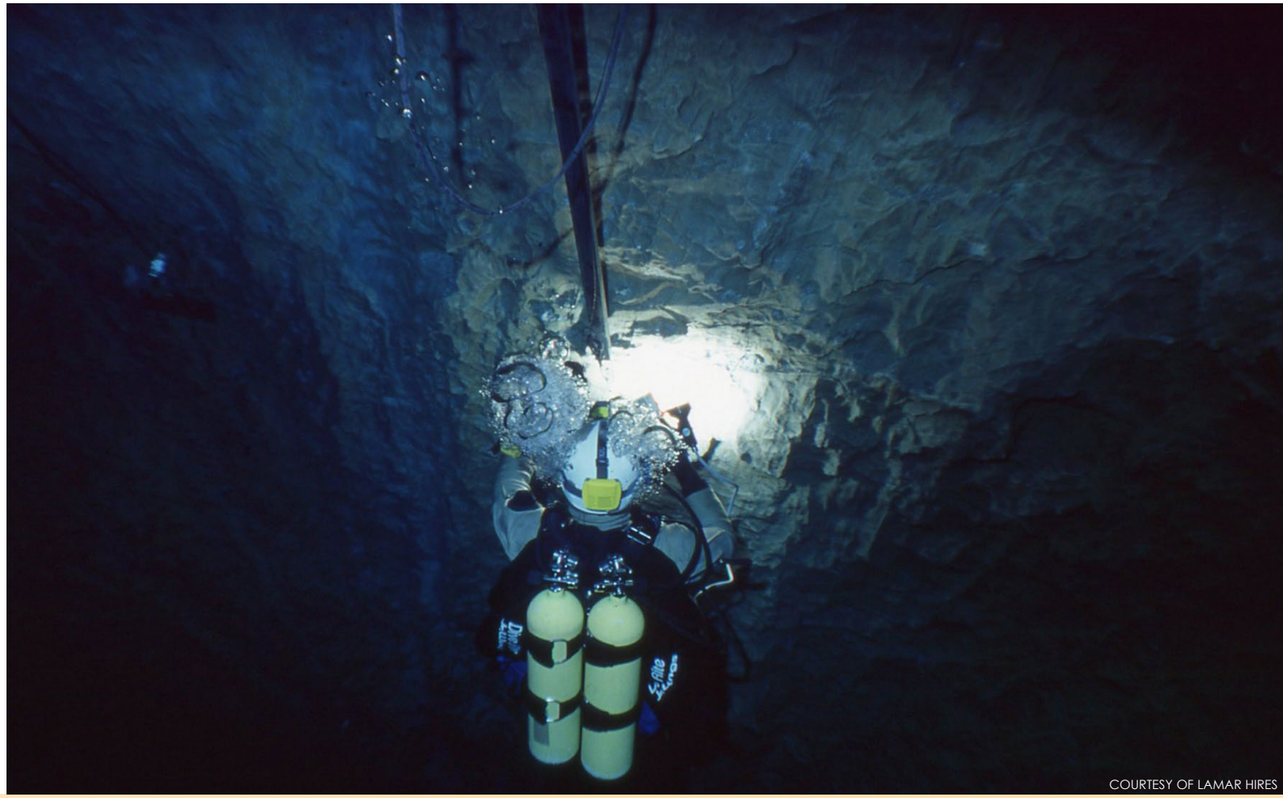
Hires said hose routing also seems to be a major current topic, with back mounters wanting sidemount to follow their rules of long and short hose. "We didn't do that because we were going into solo diving country," he said. "We planned everything for self-rescue. There was no sharing gas drills because we knew we would most likely never see the other guy in the tight spots."

When it comes to securing regulators, said Hires, one regulator on a necklace is the standard for the most part, but the other must be on a breakaway clip. "We found more than once on an exploration dive that a gas switch didn't go as planned with a regulator breathing wet or worse, getting a mouth full of silt," said Hires, "so we had to get the other regulator back in our mouths quickly."

Akka

As an explorer, Hires' dream destination is a place in which no one has been. He said he wants to lay line, map it and clear the trail for others to follow. Hires loves to travel and dive because he always sees something new and soaks it in. "Knowing that I am the first to see it makes it the dream site!" said Hires. "I like dark and scary places and not knowing what is down that hole."

Probably the most memorable cave diving experience he has had was in Japan partly due to the fact that it entailed trail blazing and discovering a virgin cave, he said. Between 1995 and 1997, Hires and his team went on three expeditions to the Iwatee Prefecture to explore some caves in the remote mountain village of Akka. The town and Japan Caving Club wanted his team to focus on Akka Cave, their tourist attraction. "It had some short sumps, but for me it wasn't real exploration," said Hires. "This was found down the road at a cave called Shigawatawi and it was this cave that inspired the TransPac."



COURTESY OF LAMAR HIRES

COURTESY OF LAMAR HIRES

THIS PAGE: Hires on a cave expedition in Japan in 1996, using the first TransPac by Dive Rite

Lamar Hires

On the first trip in the summer of 1995, diving conditions were not optimal and there were flash flood warnings. Hires' team stopped at a temple, one day, on the way to Akka. There they burned incense and the priest prayed for their health and protection on their journey, he said. "He gave each of us a charm, a small piece of wood in gift-wrapping and told us to keep it on our person," said Hires. "It would protect us from danger." The team thanked the priest and put the charms into their caving helmets.

Later on an excursion, one of the team's Japanese friends took a 4.5m (15 ft) fall from a ledge and landed on his back. "I knew he was seriously injured," said Hires. "He had to be. I hurt just watching him fall." But the man was fine and had no injuries; however, the piece of wood in his helmet had been broken in half. "To this day, that charm is still in my caving helmet," said Hires.

The first Japanese expedition proved to be an exploratory trip. "You never know if the people briefing you about the cave diving site actually know what they are talking about, especially if they don't cave dive," said Hires. "We were told the first sump was over 42m (140ft) deep and still going. This sump was 640m (2,100ft) from the entrance, so we had 15-liter cylinders shipped to Japan, since they didn't have anything that size."

Hires said he bottomed out at 9m (30ft) but starting up. "I couldn't get out of the water at a sheer ledge," he said. "I was solo on that dive." The team then spent time exploring Akka and another cave called Rysendo.

On the next trip, Hires shipped over 5-liter steel cylinders. It was February and the water temperature was 4°C (39°F) said Hires. He had with him the latest lightweight sidemount rig upon which he and Jasper had been working. The two had tested the rig with large cylinders, so they assumed it would work well with small cylinders. "Big mistake," said Hires. "The only thing that made it work was the heavy cylinders, so all we did was make it to the second sump."

On the third trip in February 1997, Hires decided to bring Dive Rite's latest product—the TransPac—in order to cope with the diving, climbing and exposure. Hires and his team were in 4°C (39°F) water/air for more than eight hours, and they finally had some luck. Indeed, the expedition eventually proved to be influential in sidemount diving in North Florida caves.

The team explored six sumps and stopped only because they ran out of duct tape to patch the holes in their drysuits. The brands Apollo and Mobby's were sponsoring the team with suits. Hires said he would receive a new suit from the sponsors, dive it for a year and then trash it during the expeditions. Mobby's created a "Lamar Hires signature drysuit," based on these expeditions.

I question why training standards haven't kept pace with equipment development. With all the advancements in equipment, training has been watered down and standards seem lower.

"To this day my adventures in Japan are my most challenging and memorable expeditions, with some of the friendliest people in the world," said Hires. "I want to go back, and hopefully will in 2017."

Hunger for knowledge

While the Japan expeditions and two rescues have been career high points for Hires, the recovery of 22 bodies and other close calls have been the low points. Exploration is still his primary drive, said Hires, but he continues to teach and share his experiences with other avid divers.

"Today, I see the excitement and hunger for knowledge in a young diver's eyes and I mentor them," said Hires. "I'm never too busy to dive with someone and help them develop."

From the equipment point of view, Hires said that teaching helps him devise and develop equipment people actually need, want and will most likely use. "Simply by diving with people of different experience levels, I get to see what is easy for them and what is difficult," he said. "You would be amazed at what experienced divers take for granted that frustrate new divers."

Interaction with divers is really important to Hires. To facilitate this interaction, Dive Rite attends and exhibits at several shows around the world. "They come to us with questions and thoughts and we value their input," said Hires. "Where we can, we test out their suggestions."

Dive Rite is a family business for Hires, whose family members work

COURTESY OF LAMAR HIRES

Hires exploring a cave in 2006 (left) and showcasing Dive Rite equipment at the EUROTEK.2014 exhibition, with his son, Jared (below)

Lamar Hires receiving the 2014 EUROTEK Lifetime Achievement Award "for his consistent contributions and discoveries that have advanced the field of technical diving"

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in the company. This gives the company the flexibility to manufacture short bespoke runs of equipment, said Hires, which the company does to develop ideas and to fulfil special requests from other companies looking for a specific item. In fact, Dive Rite recently completed a project with the Coral Restoration Foundation. "They asked us to produce a specially branded TransPac harness, a Voyager XT Wing, and a custom-made pocket for them," said Hires. "It was a fun process, and we loved working with such a worthy cause too."

Meeting people at dive shows often leads to invitations to go diving. Hires dives with many people and said he is always available to help cave divers improve their skills when they visit North Florida. He conducts sidemount clinics and mentors divers.

Hires has trained explorers as well, teaching them how to "sniff out the cave" and tailoring skills training to what they plan to do. Recently, he finished teaching a course to two divers with plans to return to their home country and explore. Preparing them for exploration was "hugely exhilarating" said Hires, as it is something for which many of today's instructors couldn't even fathom to prepare students for, because its not in any standards.

Hires does not dismiss standards. On the contrary, he said standards are important and should be understood and followed. "I helped write the training standards for cave diving in the mid-'80s when I was the fourth Training Chairman for the NSS-CDS," said Hires. Forrest Wilson was the first training chairman of NSS-CDS, followed by Wes Skiles and Joe Prosser. "Wes, Joe and myself shaped cave diving education and our work is still used today." Their accumulated knowledge in cave diving was hard earned, stemming from personal experience in dealing with recovery operations and diving activities of the day. "We used a variety of channels to get key messages out," he said.

A short documentary on cave diving safety was one such venue, which was compiled in 1997 by the cave diving community. It was entitled, *A Deceptively Easy Way to Die*. Hires was the current NSS-CDS Chairman so became the face of the safety video. Seventeen years later, the documentary quickly started trending on social media over the winter holiday season.

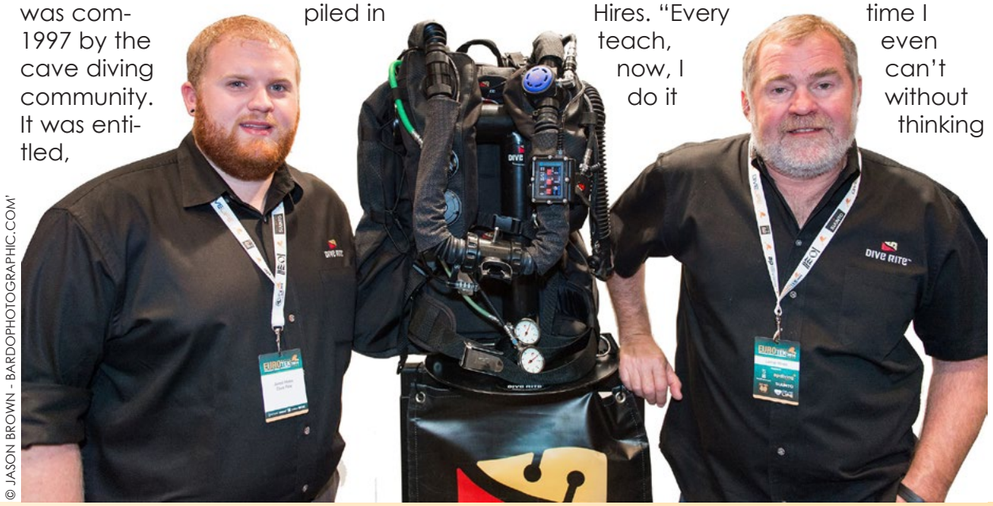
Silent night

It was the news of a cave dive that went terribly wrong, which spurred large numbers to view the safety video online.

In 2013, on Christmas morning, a 35-year-old man took his 15-year-old son for a dive. They were trying out new scuba equipment unwrapped earlier that day. It all sounds quite normal until you hear the facts: the father was not a diving instructor; the son had no scuba training; neither of them had cave diving training; and they decided to dive Eagles Nest—a very advanced cave dive requiring a minimum qualification of Full Cave certification, a Trimix ticket and appropriate experience with deep cave diving to dive it.

The dive ended tragically. The two bodies were recovered before midnight on Christmas Day. As the world questioned why it happened, *A Deceptively Easy Way to Die* appeared on Google searches and was watched.

"This film brings back memories for me of what we dealt with to educate divers and stop needless deaths," said Hires. "Every time I teach, even now, I can't do it without thinking about past recoveries and what they did wrong."



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Safety culture

After several decades in the dive industry, attitudes towards safety and standards remains a concern to Hires. "I question why training standards haven't kept pace with equipment development," he said. "With all the advancements in equipment, training has been watered down and standards seem lower."

Hires believes that divers are using equipment to compensate for lack of experience. "When you do that," he said, "it will come back and bite you hard one day."

Hires does like the idea of divers perfecting their form and trim and keeping skills up to date, but he finds it worrisome when divers think they are ready for real diving after only a few experiences in a pool or quarry. "They have not experienced currents, waves, flow, boats, challenging entries and exits," said Hires.

He added, "One of the things that helps you be a better safer diver is to choose your friends and dive buddies who support a culture of safety."

Dive, travel, see the world

Hires still believes that diving is the most rewarding sport on earth. "The pace is whatever you want it to be and you can see things that non-divers don't see," he said. "It's the best reason to travel and be part of a community that cares about the environment and friends. I would not have visited 90 percent of the places I have been to if not for diving."

Hires continues to encourage people to take up diving and he advises new divers to gain experience with people they trust. "If you're learning to dive, be ready for the adventure of your life," he said. "But please listen to those who went before you and remember training and experience are two separate things."

He shared some wisdom and advice for those who want to pursue a career in the dive industry too:

"Do it because you like the adventure and friendships, but don't do it for the money. You will never get rich diving, but you will have rich memories most will never have." ■

The Folly of Deep Air

PETER SYMES

Text by Simon Pridmore
Photos by Andrey Bizyukin
and Peter Symes

Picture the scene: conditions are perfect, with flat seas and a clear blue sky. The atmosphere on the small boat is thick with testosterone and there is much whooping and hollering and backslapping as the six divers prepare their gear. The gauntlet has been thrown down. The challenge: to descend quickly down a reef wall to 90m on a single cylinder of air, collect a handful of sand and then come back to the surface. The two individuals accepting the challenge are young, physically fit, good swimmers and experienced divers. It is an initiation ceremony; the other guys on board have all completed the task previously and earned their "wings". They are here today to cheer the new boys on.

The six divers enter the water together and all descend to 40m where the four "veterans" stop and watch the other two continue on down. At first, all they can see are two streams of bubbles, and then the two streams become one. Then the bubbles stop. They wait. Time passes. They wait a little longer.

After 15 minutes with no sign of their missing buddies, concern turns into full-blown anxiety. They separate: two of the team head for the surface to run a boat search; the others stay underwater, peering down into the blue desperately hoping for a miracle—but to no avail, the two divers are never seen again.

A dangerous game

Every year, people die diving deep on air. Many of the victims are expert divers; some are even professionals. The scuba training agencies set depth limits for both no decompression diving and planned decompression diving on air, but many interpret these limits as just well intentioned advice that might apply to beginners but certainly doesn't apply to divers with their years of experience. So, while they may pass the warnings on faithfully to others, when they dive themselves, they do not practice what they preach and exceed the limits, often with tragic consequences.

These divers are ignoring a basic truth. Surviving ultra deep dives on air has nothing to do with experience, competence or courage. The reasons that diving deep on air is so dangerous are all bound up with human physiology itself and none of us can beat that. None of us is superhuman!

The problem with deep air diving is not the "deep" word. Diving deep is fine, as long as you have the right experi-

ence, the right equipment, the right training and, most of all, the right gases. The problem is the "air" word and what happens to your body and mind when you breathe air underwater. There are four major issues, which can combine to cause deep divers insurmountable difficulties.

The problems with air

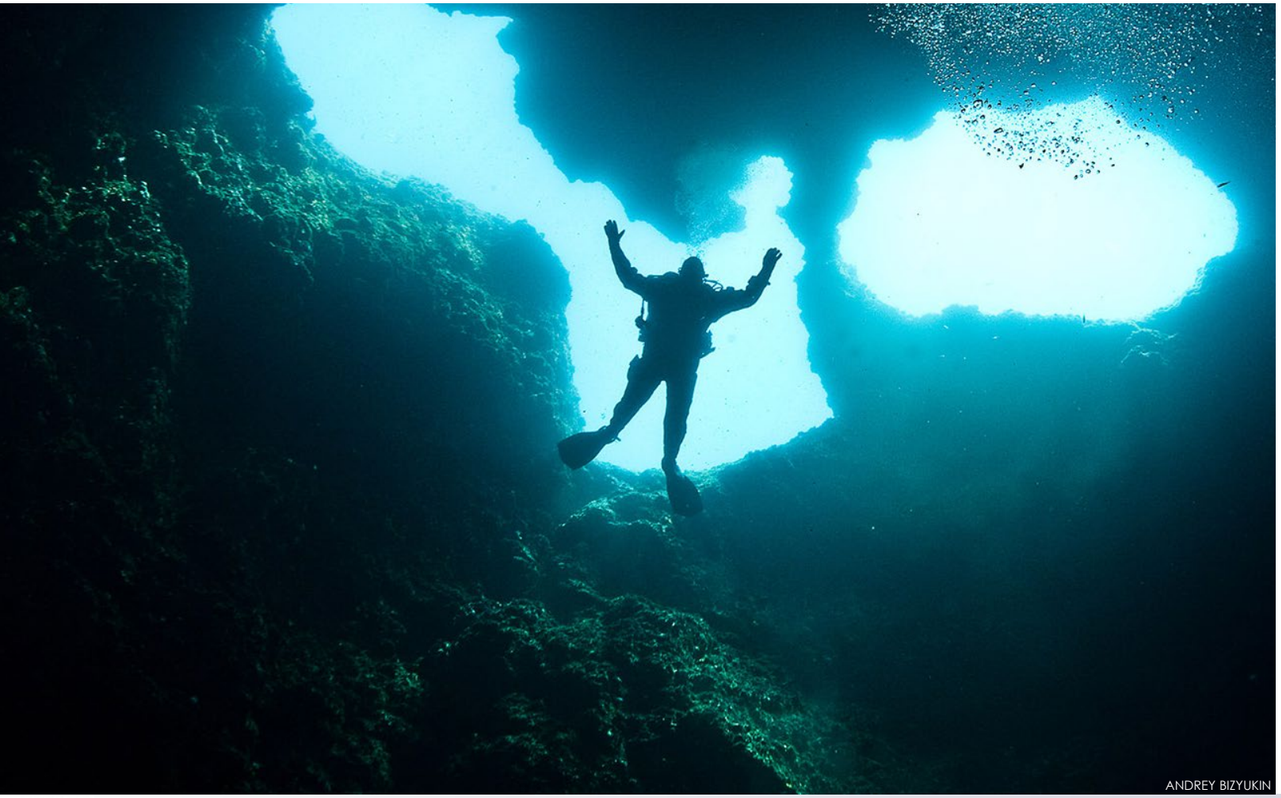
First, air contains oxygen, a gas that we need to sustain life. However, if we consume it in too large a dose, oxygen can cause disabling convulsions. These can lead to drowning if they occur underwater because affected divers cannot control themselves or their equipment while the convulsions are taking place.

At the surface, the air we breathe is completely safe, but when we breathe air on scuba below 50m or so, we start to push the upper limits of the dose of oxygen that a swimming diver can breathe safely, and there is a real risk of oxygen-induced convulsions.

The second issue with air is that it is dense and, like all gasses, it becomes denser as its pressure increases. Therefore, the deeper we dive, the denser the air becomes and the more difficult it is to breathe. When we dive, the artificial apparatus we use and the water pressure all around us already make our breathing less efficient. So when we are deep on air, it becomes harder for us to fill our lungs. More importantly, it also becomes harder to empty them between each breath.

This leads to the third issue. The primary consequence of reduced breathing efficiency is that we retain more carbon dioxide (CO_2) in our lungs and bloodstream. The increased CO_2 level not only makes us more susceptible to an oxygen toxicity convulsion, it can also trigger our automatic emergency response system, the final phase of which is panic, the diver's worst enemy.

ANDREY BIZYUKIN



ANDREY BIZYUKIN

Underwater, trained deep divers with a clear head may identify the process that is causing an onset of anxiety, cease all activity and take a series of deep full breaths to reduce the CO_2 level in their bloodstream.

However, the fourth and final issue means that divers breathing air at depth are unlikely to be able to exercise the clarity of thought required to resolve their predicament.

The three main gasses present in our bodies when we breathe air are oxygen, CO_2 and nitrogen, all of which have something called anaesthetic potential. This means that, in sufficient quantity, each gas can knock a person out. The deeper a diver goes, the more the partial pressure of each gas increases, and the greater its anaesthetic potential becomes. This produces the phenomenon we call narcosis.

The subjective symptoms of narcosis often differ, but objectively, narcosis makes us overconfident, relaxed and inattentive, which means we are unable to respond to an emergency quickly or rationally. An anxious diver in the grip of narcosis is unlikely to be able to identify the body chemistry that is causing his anxiety and react correctly, leaving full-blown unreasoning panic as the inevitable consequence.

Limits and deep desires

So, the cumulative risks presented by these four factors—oxygen, gas density, CO_2 and narcosis—make air completely unsuitable as a deep diving gas.

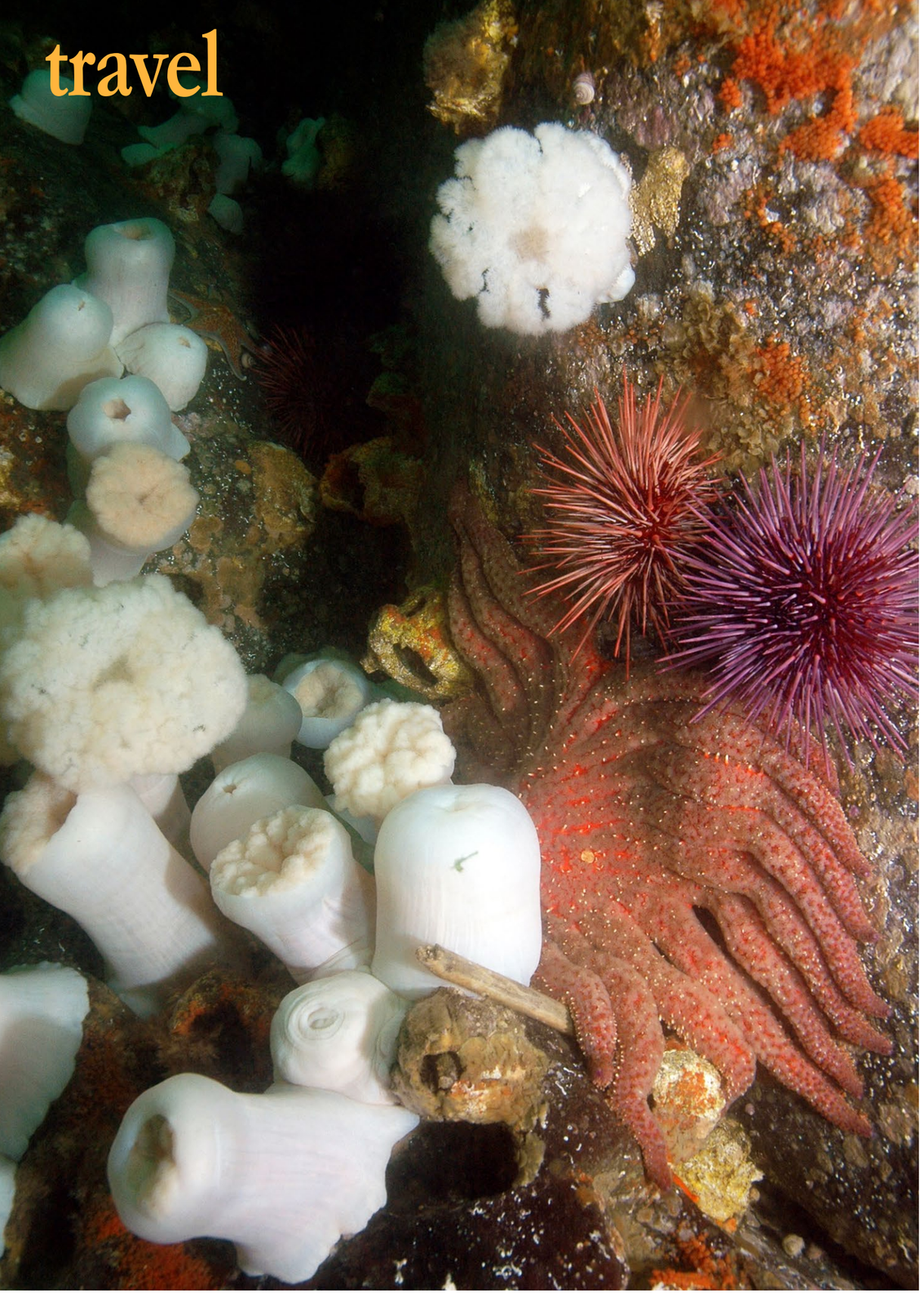
However, if you have deeper desires, if your diving ambitions extend beyond the commonly accepted limits for air, do not be disheartened, for there is good news! A solution exists, and this will be the subject of the Scuba Confidential column entitled "The Joy of Mix" in the next issue of *X-RAY MAG*. ■

Simon Pridmore has been part of the scuba diving scene in Asia, Europe and the United States (well, Guam) for the past 20 years or so. His latest book, Scuba Confidential, *is available in paperback, audiobook and e-book on Amazon. His new book,* Scuba Professional, *was released in July 2015.*

Underwater Nanaimo

— British Columbia, Canada

Text and photos by Barb Roy



Divers wait for slack tide to enjoy the underwater beauty found at Dodd Narrows in Nanaimo

A boat making its way through Dodd Narrows; Painted anemone, Snake Island
PREVIOIUS PAGE: Diver Wayne Grant with feather stars on *Cape Breton* wreck

I am often asked, "Where is the best place to photograph underwater critters in British Columbia?" Well, there is certainly no simple answer to this question and I usually end up replying something like this; "Unless there is a plankton bloom, bad weather or visibility is poor, there are no bad places to dive in BC, therefore you can see critters on every dive!"

This is especially true around Nanaimo, a popular hub destination on Vancouver Island that is easy to get to and can be frequented by divers on a year-round basis. For me, it's the opportunity to photograph a variety of abundant colorful underwater residents that seem to flourish at all the local boat and shore diving sites in the area.

I have listed below some of the more preferred spots I have personally enjoyed photographing in the past with my husband, Wayne Grant, who likes to shoot video. Most of these dives are within a 15- to 20-minute boat ride from the local dock. Keep in mind, however that marine residents change over time and it is up to you, the diver/photographer, to keep your eyes open and your cameras ready!

Neck Point

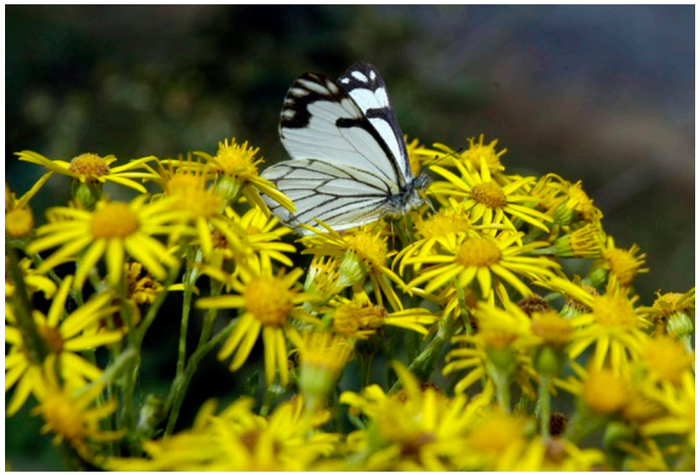
Neck Point has always been one of my favorite dives because we often find resident octopi, wolf-eels and giant nudibranchs. The site consists of a large sheltered cove that tapers down to between 60 and 90 feet (18 to 27 meters) near an outcropping reef with

Harbor seals on beach at Snake Island (left); Butterfly on Cable Bay Trail to Dodd Narrows (below)

exposed rocks. Many divers do this as a shore dive, but I like the convenience of leisurely stepping off a boat and having it pick me up wherever I end up.

In the shallow pebble cove, we have found orange and cream coloured giant nudibranchs on the bottom searching for a meal of burrowing anemones. Huge sunflower sea stars can also be found here. If you head out to the reef and on the outer side, there is a fairly vertical wall supporting an array of sponges, crabs, nudibranchs and snails. Continuing in the direction towards town and a bit deeper, is a diamond-shaped rock. At the base is a den where you never know what you might find! It could be a lingcod, wolf-eel or octopus.

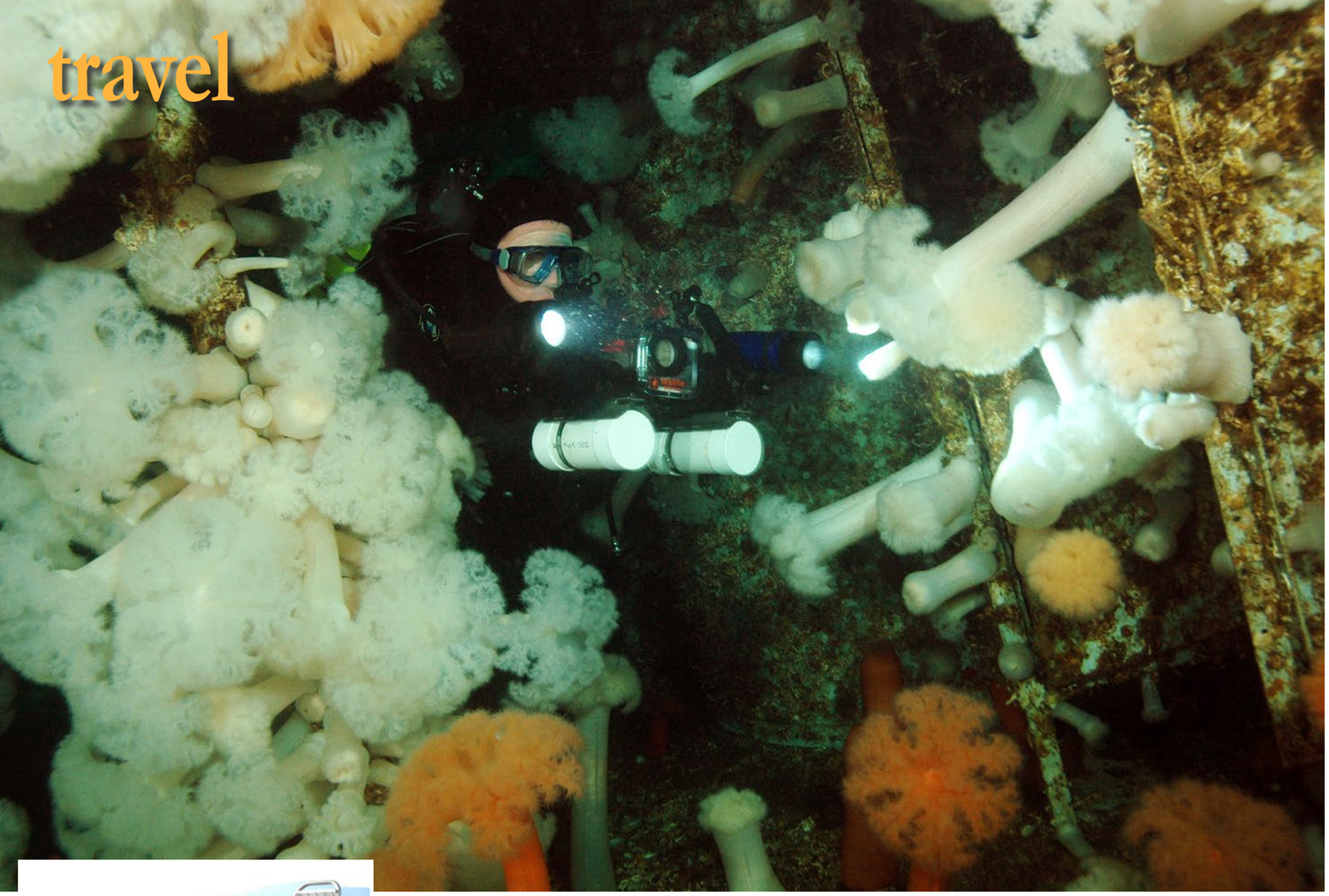
This dive site is where I took Wayne on one of his first ocean dives over 15 years ago for his final checkout dives. We saw not only the octopus but two wolf-eels and had several sea lions swim by to check us out. What a rush it was!



Snake Island Wall

I like to refer to this dive, on the north side of the small sandstone island, as nudibranch heaven. Wayne thinks of it as wolf-eel heaven because we have followed many wolf-eels out in the open as they have made their way across a flat stretch of terrain in about 20 feet (6 meters) of water while searching for food. If you have a keen eye, it is possible to spot grunt sculpins on the rocky bottom or see tiny decorator crabs scurrying about. Decorator crabs get their names by collecting various things living in the area and affixing them to their back carapace. If they

Resident wolf-eel at Neck Point dive site (above); Huge sea star at Gabriola Pass (left)



move to a new area, they pull off all the old things (sponge, anemones, kelp) and reattach the new surrounding décor.

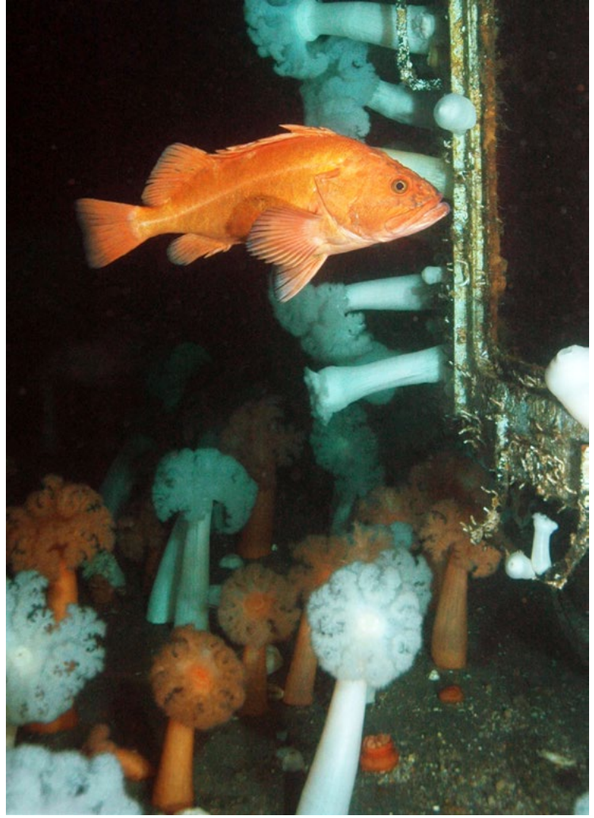
Although this is a great macro photography site for the small things, I also like it for wide-angle photography. As you head away from the island, the depth continually increases until you reach a beautiful wall. Some sections are covered in tall plumose anemones, creating a waterfall of white cascading down. Technical diving friends have told me of giant cloud sponges in the 200-foot (61-meter) range.

"Nanaimo also offers an exciting experience for snorkelers at Snake Island," said Ed Singer, owner of the dive store and charter operation, Sundown Diving, located in Nanaimo for over 30 years. "Snorkeling with the resident harbor seal colony is very popular at Snake Island. This experience always brings smiles even to the most experienced divers as quite often interaction with these mammals can be very close."

Ed's dive store and charter boat offer individuals and families the opportunity to go on special charters where they supply all of the gear and spend several hours playing in the water. During a dive charter, divers will often spend their downtime between dives on the wrecks (other side of island), snorkeling with the seals.

Saskatchewan wreck

The retired Canadian military vessel, HMCS *Saskatchewan* was scuttled in June 1997. Since then, a plethora of life has laid claim to its 366 feet (111 meters) of steel hull. Looking at the wreck now will make you question if it is steel or stone under the massive amount of orange and white

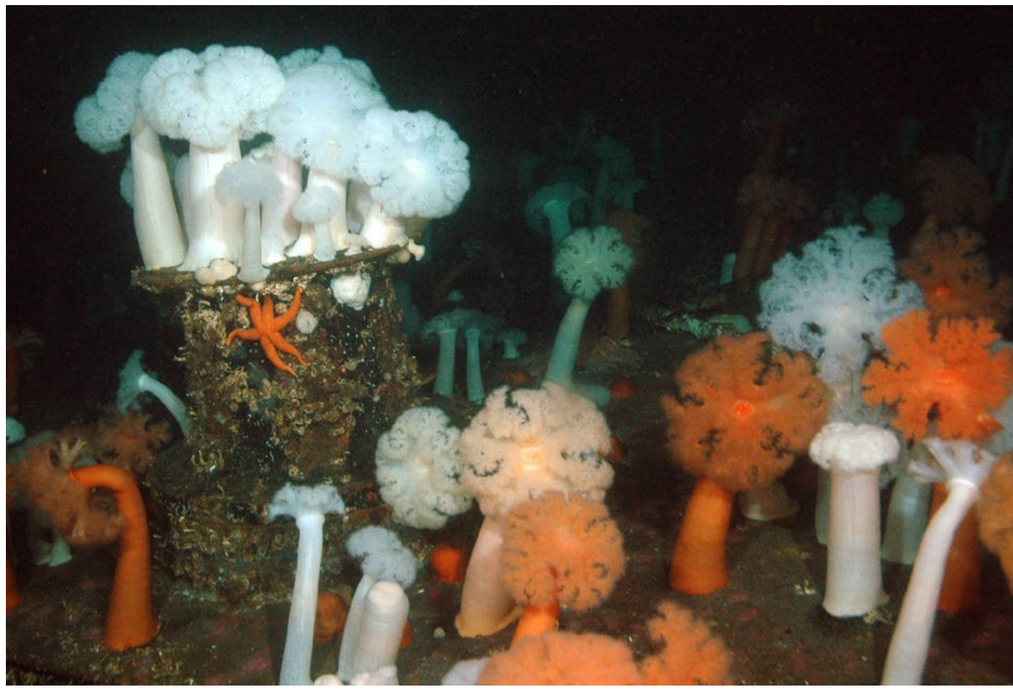


Nanaimo

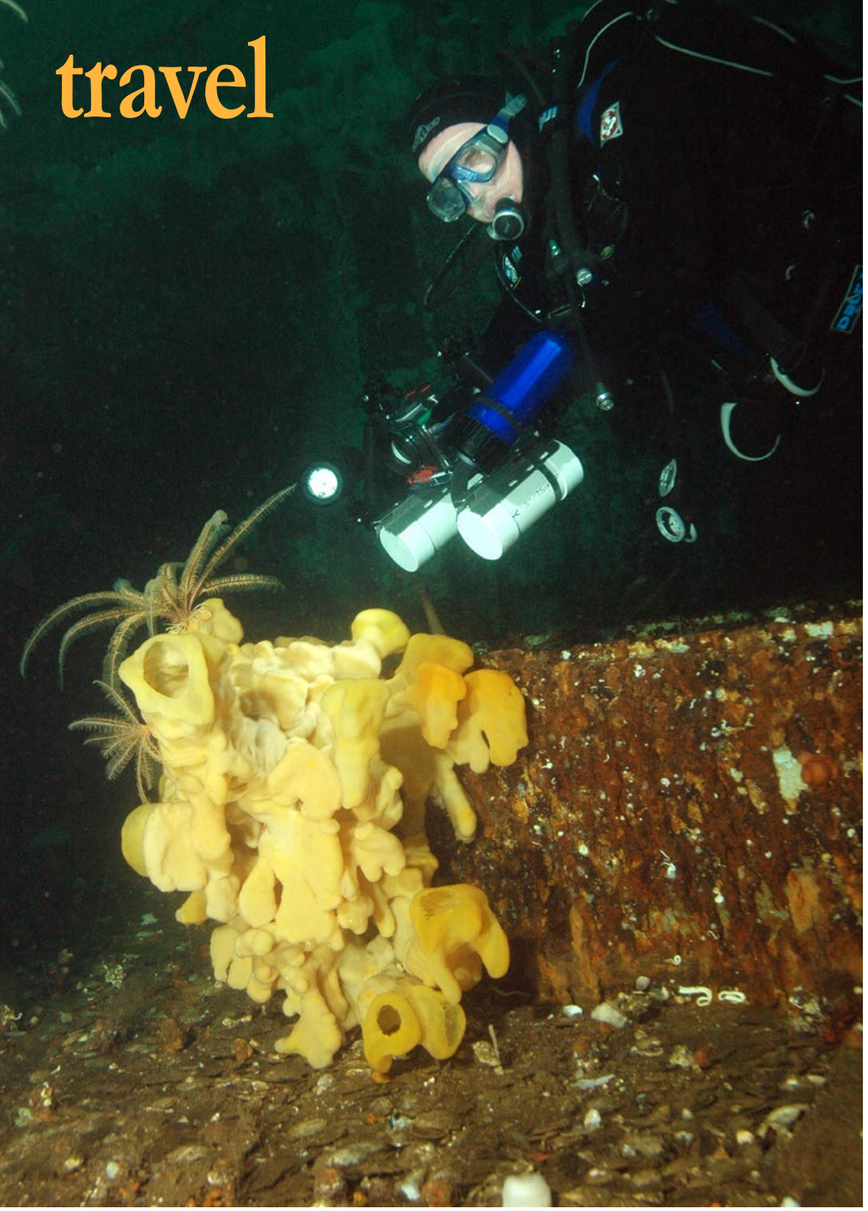
plumose anemones. Ranging in size from a few inches to almost two feet, the anemones have transformed the harsh structures into a pastel soft texture. Over the years, millions of fish have used the wreck and the neighboring one, *Cape Breton*, as a nursery. Commonly seen are various species of rockfish, lingcod, perch, cabezon, and other assorted fish.

Not only are the large wrecks great to see critters, they are also used for training by divers to practice their wreck-diving skills and by technical divers employing their deep diving techniques.

One of my favorite things to do on this dive is to visit the



COUNTER-CLOCKWISE FROM ABOVE: Colorful deck of *Saskatchewan* wreck; Large resident yelloweye rockfish on *Saskatchewan*; Both of Nanaimo's large wrecks are covered with life; Divers preparing to dive on *Cape Breton*



Diver Wayne Grant exploring *Cape Breton* wreck (left); Current speed in Dodd Narrows can get up to nine knots (right); Cable Bay Trail leading to Joan Point Park and Dodd Narrows (lower right); Magic carpet ride through Dodd Narrows (below)

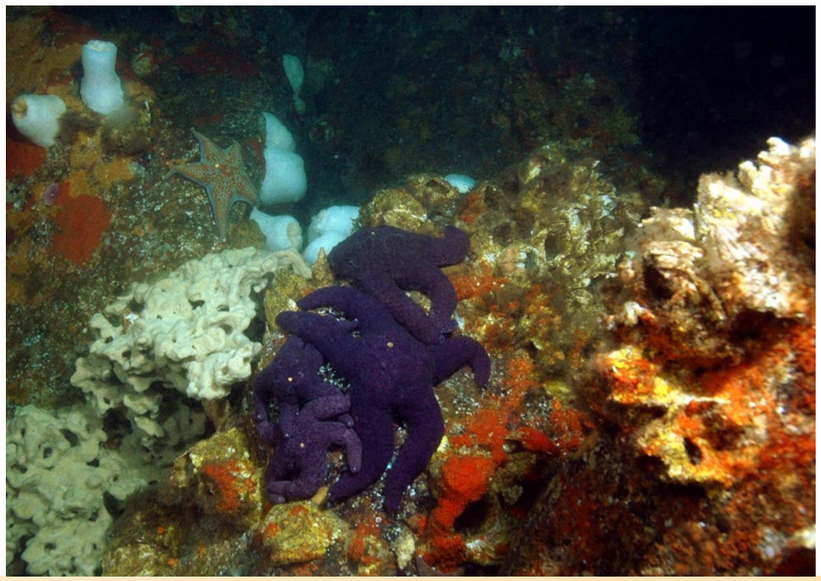
resident yelloweye rockfish. They can be shy illusive creatures and sometimes hard to find, but if you do, it is quite a sight! These bright orange fish can get exceptionally large and can easily startle a diver if you are swimming along and the sun is behind a cloud and it is dark down there… You get the picture, hopefully.

Cape Breton wreck

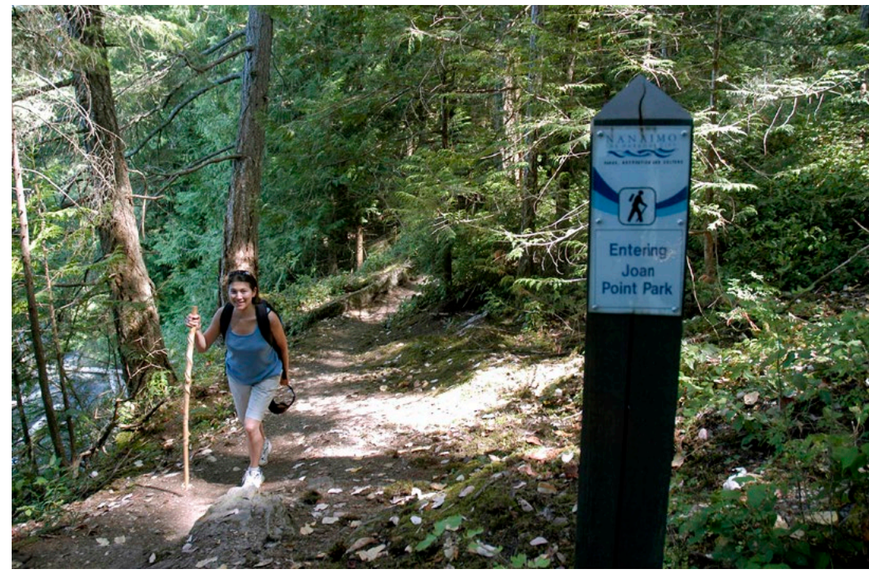
The HMCS *Cape Breton* has really gained a bountiful supply of life covering its many decks and structures since it was scuttled in October 2001. I like how the rust sickles hang from sagging wire rails along the sides. Looks like something you might see on a National Geographic special, only you don't have to venture over a thousand feet under the water to see it!

The last time we explored the Breton, there were hundreds of brown and gold feather stars (sea lily) clinging to the wire-railings as they fed on the plankton. When they wanted to move to a different spot, they simply detached and swam to wherever they chose to land. Also growing on the main deck and inside a couple of the rooms, open to divers, we photographed huge clusters of yellow cloud sponges. At every visit, they seemed to grow a bit bigger and spread out even more! If you look closely, you might find young quillback rockfish hiding in the sponge.

If you have the opportunity to check out the back of this ship, I encourage you to do so. I can easily spend a whole dive peeking into the multiple exposed decks and rooms because 40 feet (12 meters) of the stern was removed before sinking. I wouldn't recommend entering though, unless you are trained in dealing with overhead environments and are equipped with proper exploration gear. But all over this area, you can find lacy white tunicates, sea stars, nudibranchs, anemones and a wealth of other fish and invertebrate life.

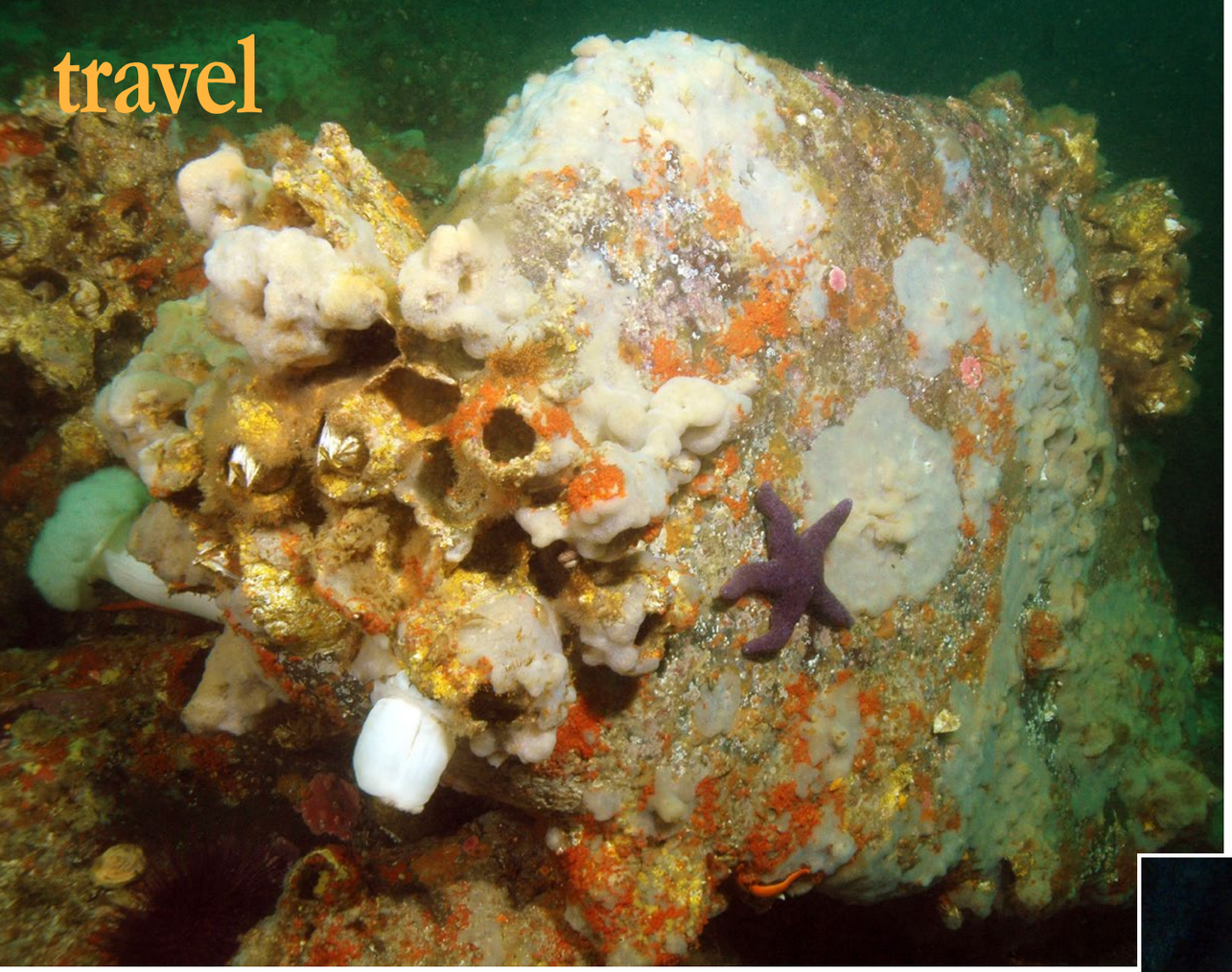


Throughout both ships, large holes have been cut in the decks and hulls, designed to be large enough for divers to fit through. But inside can be quite disorientating, so make sure you heed on the side of caution. Overall length of this World War II Victory ship is around 400 feet (122 meters).



Dodd Narrows

Since huge amounts of water are pushed through this tiny channel located between Mudge Island and Vancouver Island, divers can enjoy a spectacular photogenic ride over a carpet of color! This

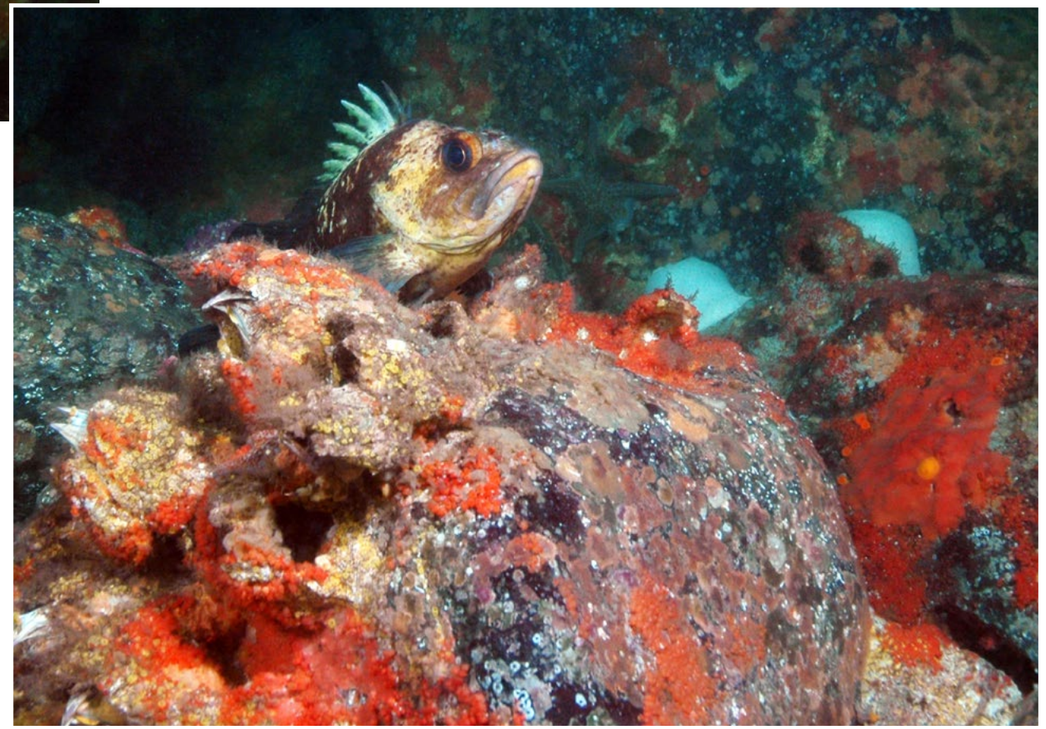


Dodd Narrows offers a vivid array of critters and colors (left); Quillback rockfish at Gabriola Pass—another of Nanaimo's drift dives worth doing (below)

Nanaimo

All along the channel are large boulders, mostly covered with some form of yellow, orange, green or red invertebrate life, giving them a bright color under giant barnacles competing for space when the current returns. Limpets, snails and uniquely patterned chitons adorn the deeper shelves while tiny sculpins peer out from holes under fronds of kelp.

I am always astonished to see how beautiful an entire area can be, covered by thousands of small white and pink anemones. This is what it can be like in both Dodd Narrows and Gabriola Pass!



Lingcod (above) keeping and eye on me at the end of Dodd Narrows dive

is one of those uniquely different drift diving experiences because of what you might see, but timing is everything. A good boat captain will put you in the water at just the right time, when the water slows to change direction, which is called slack tide. The dive will be anywhere from 20 to 40 minutes, so when it is time to exit the water, please do so! (Because if you overstay, you will get caught in and fight an increasing current as the tide heads out.)

Some sections are covered in tiny anemones and others in vivid pink and purple encrusting hydrocoral. Even huge rocks on the bottom might be covered in a coat of yellow and tan zoanthids. Octopi like to hide under the stone overhangs and groups of jelly-looking slime-tube feather-duster worms can be found in many of the cracks. I have always liked using a close-up lens or wide-angle if I want to include divers in my shots.

Upon early entries, or when doing their safety stops, divers can hang out in a forest of kelp at either end of the channel. On sunny days, I have always liked how rays of sunshine will rain down between fronds of kelp, causing a glittering appearance on the reef below. In turn, resting greenlings, sculpins and rockfish on the reef tend to light up! This is where I wish I could also use video!

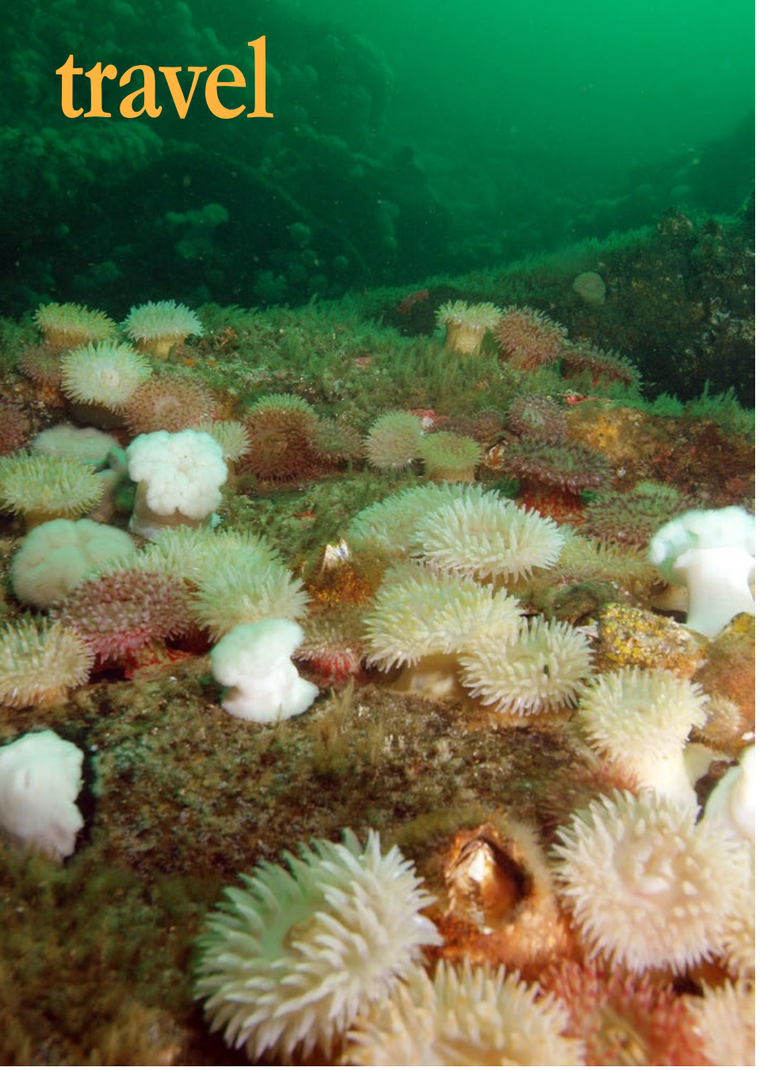
Gabriola Pass

A narrow opening for water to flow through is found between Gabriola Island and Valdes Island. Similar to Dodd, it is equally as important to select a proper slack current before entering the water. This site is where I have photographed numerous anemones in all shapes, sizes and colors. The anemones start in just a few feet of water, down to 40 feet (12 meters) and beyond, which is great for close-up or macro photography.

Other dive sites

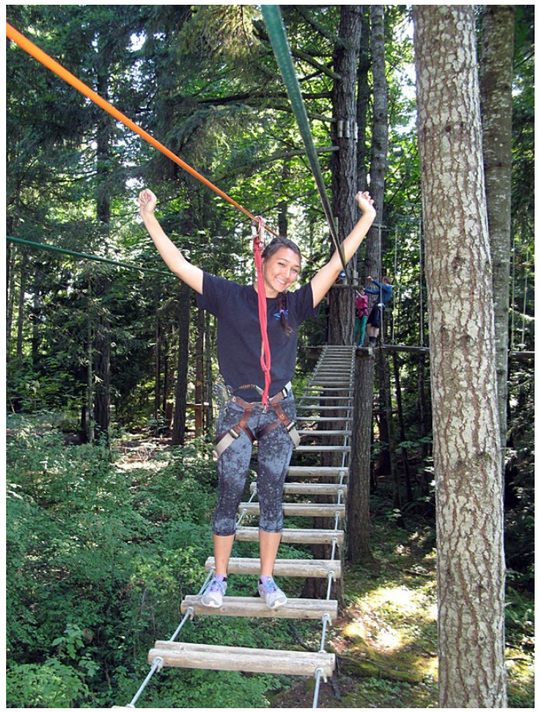
Orlebar Point on the northeast side of Gabriola Island is a deep sandstone wall accessible by shore. When weather is poor, dive operators might visit the *Rivtow Lion*, a 157-foot tugboat sitting upright in 80 feet (24 meters) of water off Newcastle Island. I like diving on the *Rivtow* even when the weather is good! The ship is easy to swim around, and is open and accessible to explore.

These are but a few



Harbor seal watching divers at Snake Island (left); Normally a high current area, Gabriola Pass hosts a variety of critters (far left); Author's granddaughter Allie having fun on a zip-line at WildPlay Element Park in Nanaimo (lower left)

Map of Vancouver Island with location of Nanaimo (above); Map of North America with location of Vancouver Island in Canada (top inset)



of the sites Nanaimo has to offer. Any of the local dive stores or charter operators servicing the area will have their own list to choose from. Another of the operators Wayne and I have been out with is Sea Dragon Charters. One of the owners, Jan Breckman, said:

"Our boat is now located at the new Marinaside Resort in Nanaimo. We also have our own air fill station right on the dock beside our boat, so divers don't have to haul tanks off and get air fills. Divers who book through Sea Dragon Charters get approximately 30 percent off standard hotel rates. Our boat can accommodate up to 10 divers, and our captain and divemaster are both from the Nanaimo area, with many years of experience."

I did enjoy their warm cabin in the winter and their sunny upper deck during summer days. They have operated in Nanaimo for over five years and can arrange rental dive gear if needed.

Ed Singer from Sundown Diving can pick up smaller groups from the ferry and has full dive gear sets for hire, available with tanks and weights for their charters.

During my last dive excursion, when we weren't diving, I took two of my teen grandkids to WildPlay Elements Park in Nanaimo for three hours of challenging treetop traversing, yielding so much fun! From zip-lining to an activity they call the Primal Swing, we tried them all. For smaller munchkins, they offer a closer to the ground zip-line adventure. Several of our diving friends regularly partake in zip-line activities. Guess it's the adrenaline thing… But sooooo much fun!

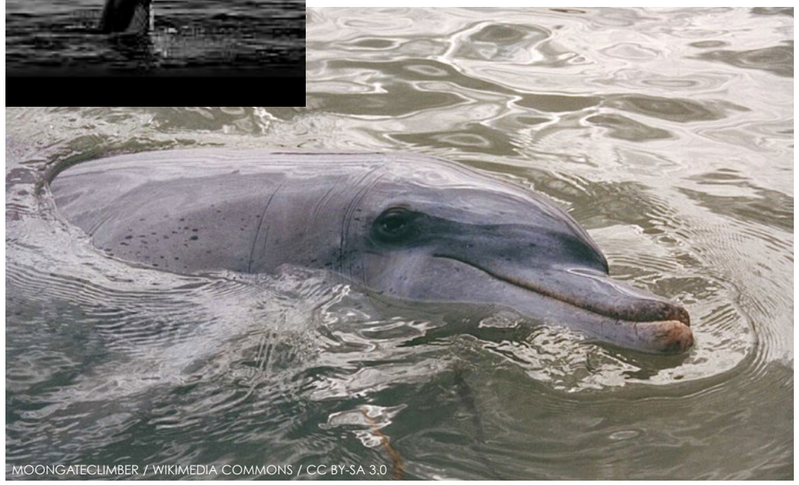
I found a great deal of information on Nanaimo dive sites in the diving guidebook, *151 Dives,* by Betty Pratt-Johnson. You can also find useful information about diving British Columbia by visiting the website of the Dive Industry Association of British Columbia (www.diveindustryassociation.com). During summer visits to Nanaimo, it is always a good idea to make reservations on BC Ferries (www.bcferries.com).

Logistical information

Nanaimo is located on the south central part of eastern Vancouver Island in British Columbia, Canada, overlooking Georgia Strait. Access is via one of BC Ferry's daily departures from Horseshoe Bay or Tsawwassen (closest to the US border).

In the Nanaimo area, there are over 15 golf courses within an hour's drive, a dozen or more awesome trails for biking or walking and some of the best fishing and paddling spots around. ■

Indo-Pacific bottlenose dolphin



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Male dolphins roam far for sex

A recent study suggests that male Indo-Pacific bottlenose dolphins travel long distances along the South West coastline in Western Australia in search of sex. Meanwhile their female counterparts stay closer to home.

In the study conducted by the Cetacean Research Unit at Murdoch University, areas regularly roved by male dolphins were compared to those roved by females, in their home ranges around Bunbury. The data collected showed that the female dolphin population kept to smaller areas (40 squ km or less), while the males travelled the coast (up to 180 squ km) looking for mates in other female populations.

According to researcher Kate Sprogis, dolphin behavior in her study pointed to males keeping larger home ranges in order to find as many mating partners as possible. In contrast, the females stayed in contained areas in part to raise their offspring.

"The scientific term is a polyamorous species, and what I found is that the males in Bunbury are generally ranging over larger areas than the females," said Sprogis. "We think that's because they want to cover as many female home ranges as possible ... to be able to pass their genes on to the next generation."

Findings of the study conducted as part of the South West Marine Research Program can be used to inform officials and industry about the Bunbury dolphins habitat and behavior when considering port expansion or coastal development, said Sprogis. Industry and tourism could have a heavy impact on the dolphins—primarily females and calves—that use areas close to the port of Bunbury, she said. ■ SOURCE: ABC.NET.AU

US begins survey of rare right whales in Gulf of Alaska

It is the first search for the critically endangered North Pacific right whale made by the federal government in over ten years.

In August, scientists from the National Oceanic and Atmospheric Administration (NOAA) set out aboard the research vessel *Reuben Laskerto* for a month-long research survey of one of the most endangered marine mammals to enter US waters.

It is estimated that there are only about 30 individuals left. The populations of right whales were decimated during extensive whaling in the 19th century. Indeed, the term 'right' meant 'easiest' to catch in the lingo of the times, as the whales were docile, slow and floated even in death.

In the 1960s, the former Soviet Union took large illegal catches, which decimated the whales numbers further. Researchers hope to garner data on the few left in the sea to assist in the development of strategies that will help the whales recover their former numbers.

Whale of mystery

"We actually know very little about this species," said the survey's chief scientist, Brenda Rone, of the Alaska Fisheries Science Center, a NOAA Fisheries affiliate. "We hope to collect photos, tissue and fecal samples, as well as sound recordings of sighted whales."

Data collected will help researchers identify whales individually. They then can monitor the health and movements of the animal through US waters. Findings about where the whales travel, how they feed, what they eat and how they raise their offspring will inform resource managers on how to better protect the whales and their habitats.

Hard to find

To date, right whales of the Bering Sea have been the source of the little information currently available to scientists on the species. The current survey will focus on the Gulf of Alaska, a critical habitat of the North Pacific right whales, where there have been rare sightings of the animal in the last few years.

It will therefore be a challenge for researchers to find individuals to study. So they plan to use acoustic equipment to find the whales by their unique underwater vocalization, which is scientists describe as a "gunshot" call.

Once found, data will be collected about the animal including photographs of discerning marks on their bodies, such as callosities, or growths, on their heads, which are unique to each animal—like a fingerprint. Tissue samples will also be collected to learn more about the whale's health and condition as well as about whale genetics. When possible, a satellite tag will be attached to the animal so its movements over time can be monitored. ■

SOURCES: NOAA, USA TODAY

JOHN DURBAN / AFSC / NOAA FISHERIES

North Pacific right whale

Blue Sharks

Of Condor Banks

Text by Kurt Amsler and Peter Symes
Photos by Kurt Amsler and Fred Byule

Freediving with blue sharks is a dream come true for many divers. The irridescent blues of this slender and graceful creature make it seem to appear and vanish from another dimension as it moves through the shifting light of the ocean. It has long pectoral fins, which complement its narrow form, a pointed nose, and large eyes. Like other sharks, it is curious about divers, and will come close for a look.

The Azore Islands, located off Portugal in the North Atlantic Ocean, are convenient stop-overs for migrating oceanic sharks, and blue sharks congregate there in the summer months. Divers can rendezvous with them at the Condor Banks, located 35km off the island of Faial. The bank is about 180m deep, and has become a popular shark dive spot, having been the only place in the Azore Islands where fishing is prohibited.

Kurt Amsler said, "This place is definitely the best spot on the planet to freedive with blue sharks! The Condor Banks was the first protected area in the Azores Islands and the result of this decision is evident!"

The shortfin mako also migrates through here, and when it soars up from the depths, the blue sharks leave—the speed at which they can suddenly move is one of the intriguing things about them. But when the coast is clear again, the blues return.

Pictured in this article, freediving with blue sharks on the Condor Banks is Kurt Amsler, photographed by his friend, freediving champion Fred Buyle.

Blue Sharks

THIS PAGE: Scenes from freediving with blue sharks, Condor Banks, Azores

Physical fitness

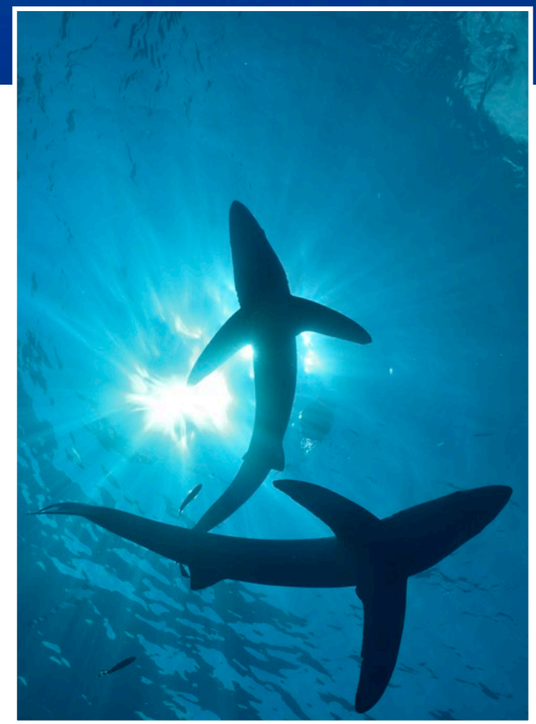
Photography while freediving requires physical fitness, but in many cases, it is the only way to get your camera in front of the subject. There are several photographers whose most spectacular underwater images are shot while freediving.

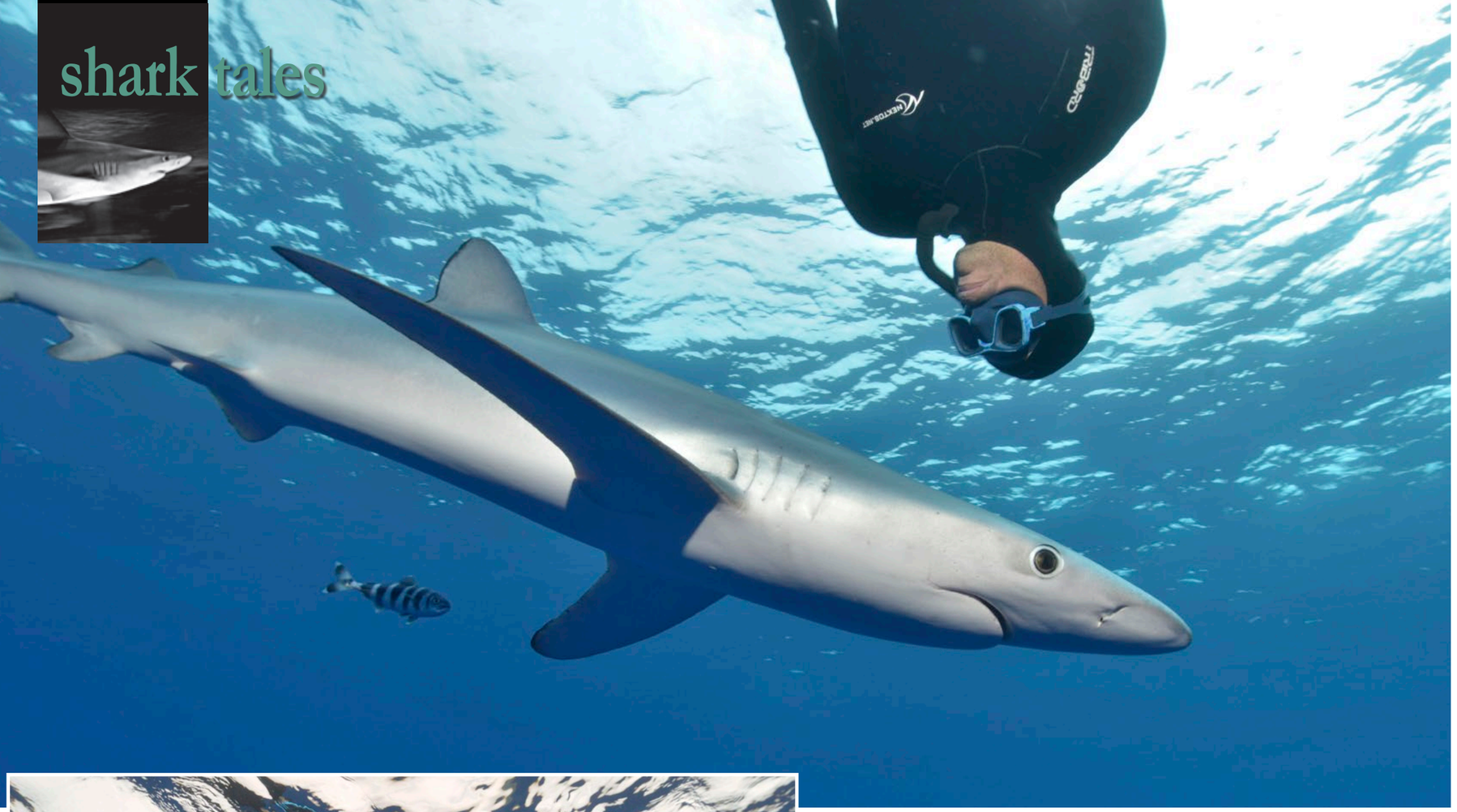
Without noisy bubbles, it is obviously easier to approach shy creatures and get within the camera's shooting distance. With experience, the animals tend to accept the presence of the photographer much sooner.

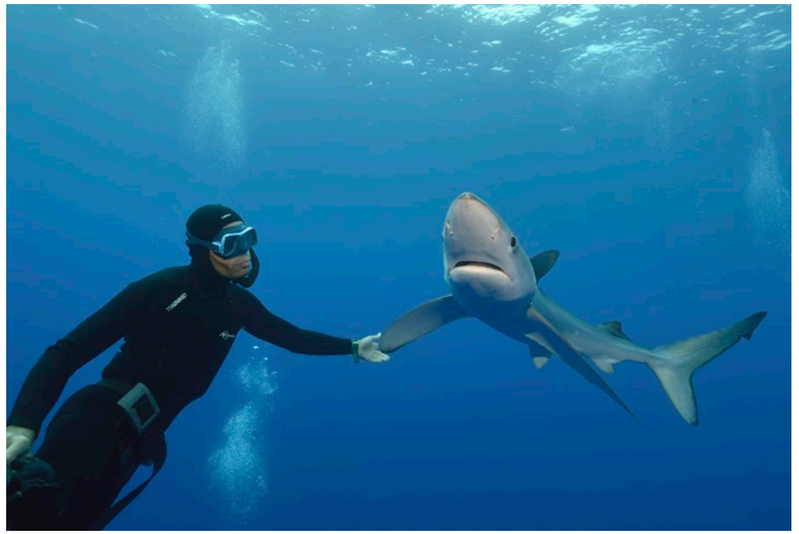
Freediving is also the only way for photographers to somewhat keep up with fast-moving animals such as marine mammals, sharks and other pelagic creatures—an undertaking that would be outright impossible while wearing cumbersome scuba gear.

The camera

Because the freediving photographer—in contrast to the scuba diver—swims considerable distances and moves about more, both the camera and diving gear need to be adapted to this style of diving. The camera must be as streamlined and compact as possible. In general, there is no need for a flash. If you cannot do without one, do with just one. The resistance from pushing a double flash configuration through the water column can be draining. It is cumbersome to position the rig in a







THIS PAGE: Interactions with blue sharks reveal some curious and intriguing characteristics and behaviors

Blue Sharks

hurry, and its appearance can intimidate the animals.

When photographing the classic freediving subjects such as large sharks, whales, dolphins, manta rays and other pelagic marine species, it is a general rule to stay in the upper water-regions where the ambient light is sufficient and no artificial light is needed.

Diving equipment

Streamlining also applies to the diving equipment. Use a suit that fits snugly (one without wrinkles), a pair of long fins, a mask with a small volume, and a short simple snorkel.

Breathing and equalization also follows general freediving techniques but may have to be adjusted to the shooting situation. For example, it is impossible to calmly prepare for the dive while swimming alongside a whale shark. Proper freediving techniques should be learned and practiced beforehand. Freediving also carries risks, which is why you need to understand the physical and physiological theories.

The blue shark is non-aggressive towards humans. The only known attacks were the result of sharks feeling threatened or involved biting after a human captured the shark.

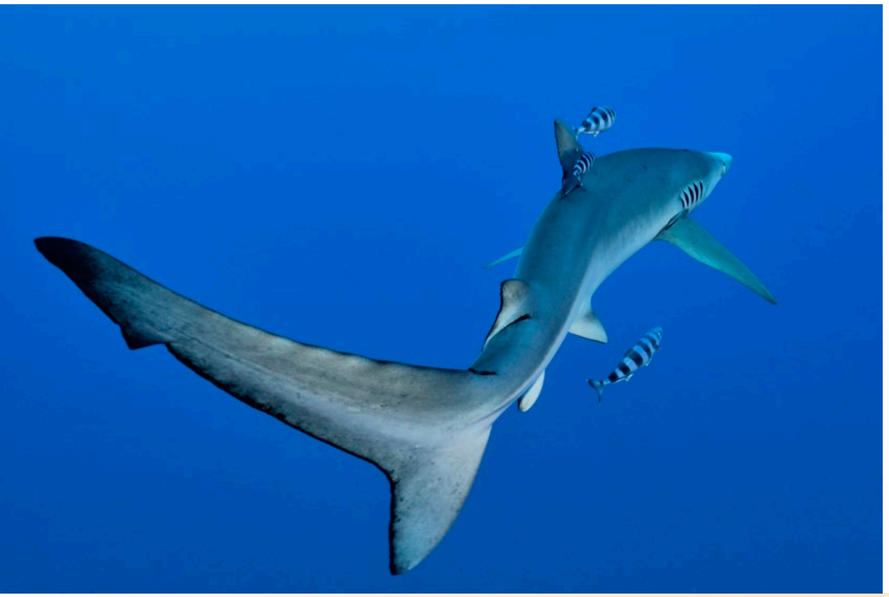
Blue sharks are found worldwide in temperate and tropical waters. They are a pelagic species that rarely come near shore but have been known to

Blue Sharks

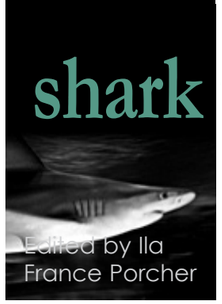
frequent inshore areas around oceanic islands and locations where the continental shelf is narrow. They prefer cooler water though, so they are often found in sub-tropical areas where it doesn't get too warm. They are one of the few species of sharks that stick together in small groups. They also show a distinct hierarchy and often form large, all-male or all-female schools—groups which contain sharks that are about the same size. No one knows why they do this.

Despite not being sought after for consumption, it is estimated that 10 to 20 million of these sharks are killed each year as a result of fishing. The skin is used to make leather, and the liver contains a lot of oil. The blue shark is classified as "near threatened" by the International Union for Conservation of Nature (IUCN) and is likely to qualify for a threatened category in the near future due to overfishing and shark finning.

■ SOURCES: IUCN, WIKIPEDIA



THIS PAGE: Various views of the blue shark, Azores



The Mysterious Megamouth Shark

The megamouth shark (*Megachasma pelagios*) is considered to be the rarest shark of all, and is the only species in its family. The first one was discovered in 1976, and it was not until 1982 that another one was found. The megamouth that washed ashore in Vietnam on 2 June 2015, was only the 68th recorded specimen. But news of 34 more megamouth sharks has surfaced. All were found around Taiwan during the past two years, raising the total number to 102!

Text by Ila France Porcher

Alex Buttigieg, of Malta, known to his friends as 'The Sharkman', has collected all the information available about each specimen. His records are now the most complete of all, and include photographs of most of the specimens. (They can be found on his website: **http://sharkmans-world.eu/mega.html**)

"My interest in megamouth sharks started the second that I found out about this very rare species." he writes. "Every record is interesting in its own right, but in some cases it is much more difficult to collect the data. Most of the sharks are already dead when discovered and quite a few end up sold for food even before researchers can get to them. This makes data collecting very difficult. The best is when the shark is released alive—and possibly tagged as happened in the United States in 1990, and more recently this year in Taiwan."

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THIS PAGE: Views of the very rare megamouth shark

Filter feeders

The megamouth is likely the smallest of the three filter-feeding species of sharks, with males maturing at about 4m and females at about 5m; the maximum confirmed maximum length is over 7m. In comparison, the basking shark reaches a length of 8m, and the largest whale shark was measured at 12.65m.

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Wide head

As its name indicates, the megamouth has a very wide head and mouth with tiny teeth. It has a long tail, similar to the thresher shark—the upper lobe is twice as long as the lower lobe.

Its reproduction is ovoviviparous. Pups develop in eggs in the mother, and are born alive. The megamouth shark has luminous photophores around its mouth, which likely serve to lure its prey closer. But since most information about it results from studying dead specimens, very little is known about its way of life.

The shark tagged off California was a male of 4.9m in length, having been caught near the surface. For two days, the tag reported the depth of the shark at different times, and it was found that it swam at a depth of between 120 to 160m during the day, and ascended to between 12 and 25m at night, travelling at the slow speed of just 1.5km per hour, presumably while filtering plancton, and other marine delicacies from the water, with its huge mouth wide open.

Breeding grounds

Buttigieg said, "I believe that the main threats to megamouth sharks are the fishing nets. It could very well be that other megamouths are being caught elsewhere without being recorded. The recent records of 34 specimens discovered in Taiwan between April 2013 and May 2015 only came to light during the latest American Elasmobranch Society meeting presentation. This could also mean that these species are not as rare as they were once thought to be in some areas.

"Researchers are looking at the possibility that there could very well be breeding grounds off the coast of eastern Taiwan. The sizes recorded range from 2.5m to 7m. Hopefully the latest tagged specimen will be able to shed more information into this mystery. I also hope that action will be taken to protect these awesome sharks."

Efforts to contact the researchers involved, however, have not been successful.

Fascination

Buttigieg became fascinated by the wonders of the submarine realm so accessible from the shores of his □

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(continued from previous page)
Mediterranean island at an early age, and was inspired to focus on sharks when Peter Gimble's classic documentary, *Blue Water, White Death*, really brought them to life for him. He became a professional scuba diving instructor and spent his free time amassing all the information he could about every species of shark known.

Sharkman's World

Following in the footsteps of his lifelong shark conservation heroes (the late) Ron and Valerie Taylor and Rodney Fox, Buttigieg started working towards shark protection and conservation, and was one of the first to warn of the dangers of overfishing them.

In 1997, he set up his web site, *Sharkman's World*, dedicated to the education, conservation and protection of sharks, and initialized and spearheaded the campaign for the great white shark protection in Malta, a campaign that lasted until September 1999, when the Maltese government gave protection to the great white shark and the basking shark. There are now a total of 15 species protected in Malta.

Buttigieg has dived with and studied sharks in many parts of the world including the Red Sea, South Africa, Fiji and Malta. He takes an active part in many international campaigns for shark protection. In 2007, he set up The Shark Group, an internet-based forum, and also in the same year, Sharkman's World became a member of the international Shark Alliance. In 2008, he was also named as the co-founder of the Let Sharks Live network, and initiated the International "Year Of The Shark – 2009" campaign.

Buttigieg has attended and spoken in many International conferences for shark conservation. He was also a regional investigator for the Mediterranean Sea and collaborated with the Global Shark Attack File (Shark Research Institute, USA). He also collaborates with the Shark Research Committee (USA), International Shark Attack File (USA), Australian Shark Attack File and Fishbase.

Buttigieg has written various articles and contributed data and information for television documentaries, scientific publications and books. ■

See also: ***http://www.xray-mag.com/content/megamouth-shark-dies-beach-vietnam***

Reef sharks travel far to give birth

According to new research, reef sharks at Western Australia's Ningaloo Reef are largely homebodies but female blacktip reef sharks might be traversing long distances to give birth in the food-rich waters.

Near sanctuary zones at Mangrove Bay and Coral Bay, marine biologists tagged 83 reef sharks. They then tracked the sharks' movements in order to find out how much protection the marine park provides the sharks. Over a two year period, the movements of blacktip reef sharks, grey reef sharks and sicklefin lemon sharks at Ningaloo Reef were examined.

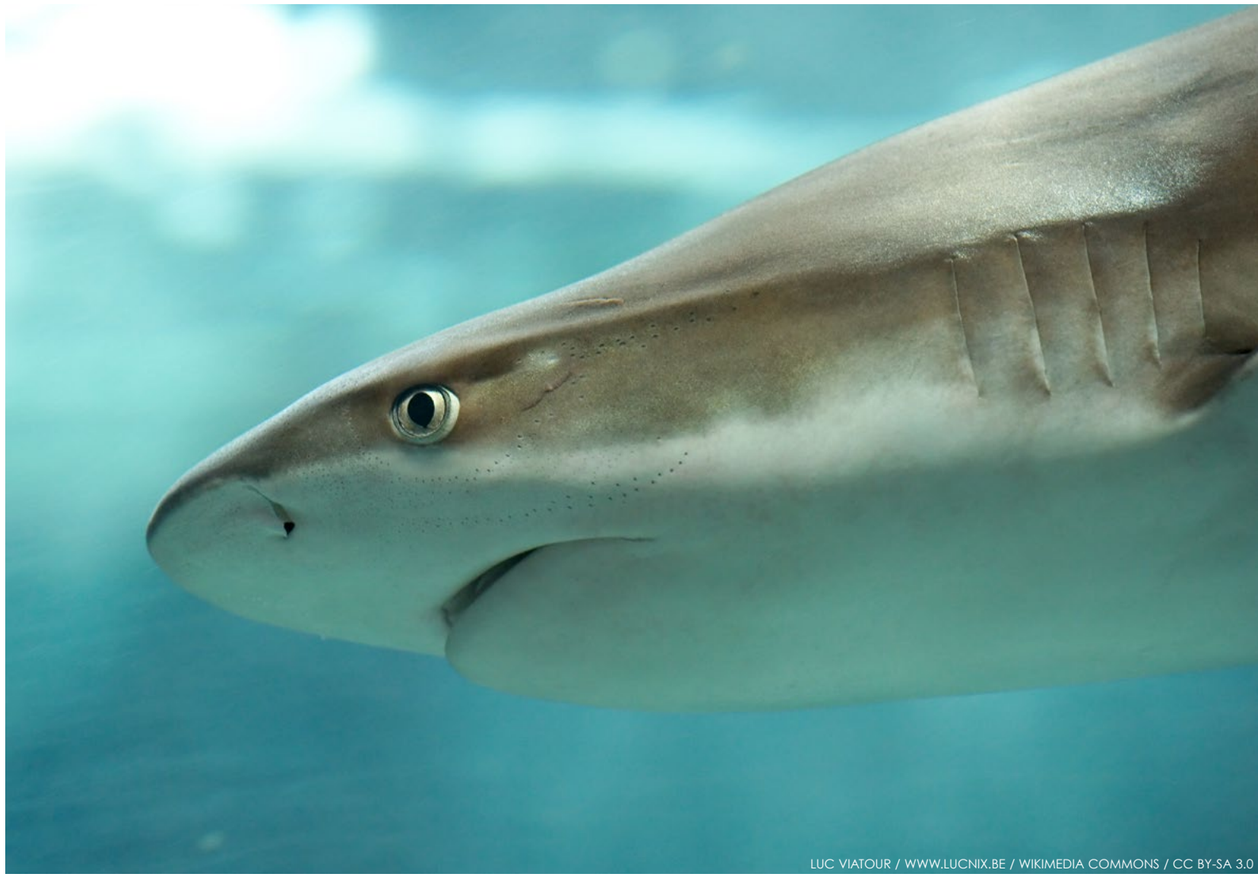
According to Australian Institute of Marine Science scientist Dr Conrad Speed, reef sharks are essentially "homebodies", with most staying in a relatively small area of less than a square kilometre to over 20 squ km. However, the study revealed some female blacktip reef sharks made long migrations during the summer months, including one individual that swam 275km.

"We had five female adult blacktips that we tagged initially in Coral Bay that swam between Coral Bay and Mangrove Bay," said Speed. "Each way it's about 130-odd kilometres, so it's quite a long distance for a shark that's only a metre and a half in length. What we think is happening is that the blacktips are likely moving from Coral Bay all the way to Mangrove Bay to give birth."

Juvenile sharks stay in lagoons and mangroves. Speed, who conducted the study as part of his doctoral research at Charles Darwin University, said mangroves make good nurseries for young sharks. "In our study [the juveniles] primarily stayed in the mangrove habitat and in the lagoon area, and that's because they don't need to range further to find more food," said Speed. "Mangrove areas are very rich in food that's suitable for small sharks and they're offered a fair amount of protection in mangroves from larger animals. They also either need to find a mate or find an area that's suitable to give birth."

Acoustic transmitters were used as tags on the sharks. A series of underwater acoustic receivers set in different places along the reef picked up data transmitted from the tags. This type of receiver is similar to those the Fisheries Department employs to detect sharks in areas off the Perth and South West coastline. ■

SOURCE: PHYS.ORG



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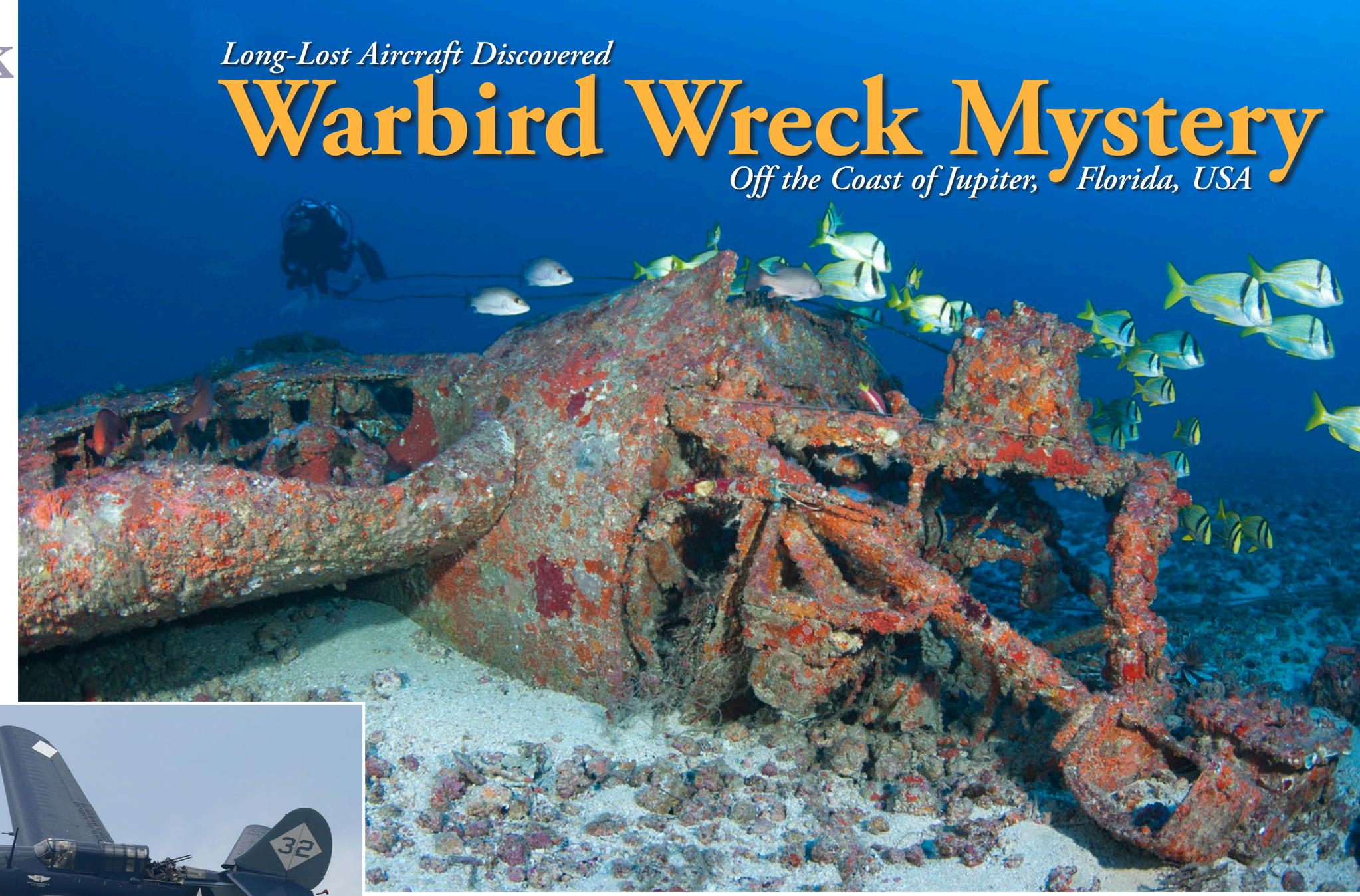
Blacktip reef shark

Long-Lost Aircraft Discovered

Warbird Wreck Mystery

Off the Coast of Jupiter, Florida, USA



Text and photos by Walt Stearns

Of the numerous types of fighter planes used in WWII, the Curtiss SB2C Helldiver is an incredibility rare aircraft. There is only one remaining in the world that is still in flying condition. Finding one of these largely intact underwater is, to say the least, highly unusual. The first such underwater find was not made until January of 2010, when a scuba shop owner in Maui discovered a Helldiver resting in 50ft (15m) of water in Maalaea Bay. Some 20 months later, a second aircraft was located just north of Palm Beach, Florida. This is the story of its discovery.

Curtiss SB2C Helldiver

The discovery

Weather throughout mid-December had become unseasonably calm, generating no more than a moderate chop four miles offshore. Taking advantage of the favorable seas, local dive charter operator Randy Jordan took a perfect opportunity to run his boat, *Emerald Diver*, a little further offshore to make a couple deep bounce dives in the 180 to 200ft (55 to 61m) range.

The location for the first drop was an area not previously visited, and Randy simply wanted to see what he might find. "A small group of us had just gotten to the bottom, and we noticed some fish swimming over to the right. Underwater visibility was excellent that day, and the current was carrying us slightly north, so I was able to swim over to see what was there. As I got closer, something came into view low to the bottom, and it was not very big. It wasn't until I was over the top of it that I realized I was looking down at the fuselage of a plane with its wings and tail still attached, resting upside down the sea floor. It was the most amazing thing," said Jordan. "Here it was just sitting there, yet it was

Historical photo from 1947 of SB2C-5 Helldiver planes on the USS *Tarawa*

the last thing I would ever expect to find out here!"

Identification

Returning the following day for a better look, Randy took several minutes of video, which he posted online in hopes that someone might identify the make and model of the mystery single engine aircraft. One thing was certain: The aircraft appeared to be of a vintage variety and had been down for quite some time, already making the chance of a positive ID difficult.

When vintage aircraft buff Kevin Knebel saw the video, he confirmed the plane was a craft from the Second World War era. "It's not really that surprising that a WWII plane would be found off Florida," said Knebel. During the war there were active air bases up and down the coast. The US Navy had facilities for training pilots at Witham Field just north of Jupiter in Martin County, another south in Fort Lauderdale and a facility in Key West, which is still active today. As such, a fair number of planes—some with the pilots—were lost off our coast; most such losses were a result of training exercise mishaps with mechanical failures.

Historical disappearances

The most infamous disappearance was that of Flight 19. Five Grumman TBM Avenger model torpedo bombers took off out of the Naval Air Station Fort Lauderdale, Florida, on 5 December 1945, on a routine overwater navigation-training mission; they were never heard from again. In addition to the loss of five planes and their crew, a PBM Mariner Flying Boat with a 13-man crew assigned to the search for the five missing Avengers, also vanished without a trace. It was later assumed the larger aircraft might have exploded in mid-air during the course of the search, but no one knows for sure.

The similarity of this plane to the missing Grumman Avengers was hard to ignore. It had obviously been down for some time, was of similar size and had an internal weapons bay for carrying bombs or torpedoes in its belly. As much as our imagination would like it to be otherwise, the mystery aircraft turned out not to be a part of Flight 19. However, Randy's discov-

Grumman TBM Avenger

Designed specifically for carrier duty in the Second World War, the Curtiss SB2C Helldiver's single-engine, two-seater design (pilot front, and RIO in the rear) had a top speed of 295mph with a payload capacity of 1,000 pounds comprised of either bombs or torpedoes, which were carried internally in the aircraft's fuselage.

US NAVY ARCHIVE

ery did turn out to be something equally rare: a Curtiss SB2C Helldiver—identifiable by its broad, rounded-shape wings and large tail.

More questions

Even with the make of the aircraft determined, there were still unanswered questions. Where did it come from and what caused it to end up in 180ft (55m) of water? Were there lives lost?

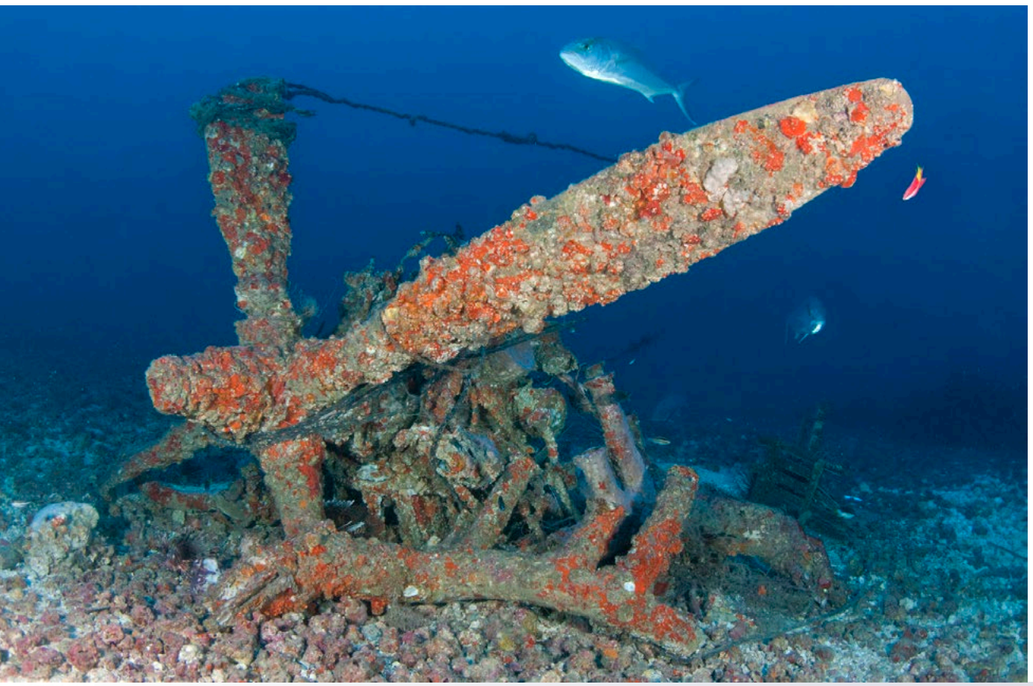
The simplest way to identify an aircraft is by finding it's Bureau of Aeronautics Navy Department (BuAer) number (similar to an automobile VIN or Vehicle Identification Number), issued to every plane built as it rolls off the assembly line. With this, Naval Archives would likely reveal the date the plane was built, as well as who flew it, where it served, and the date it was decommissioned, crashed or shot down.

The BuAer number on a Helldiver is stamped into the data plate located in the cockpit next to the pilot's right elbow. However, even assuming this plane's data plate had survived decades of submersion, it would be next to impossible to access it, because it is resting upside down on the bottom.

Sunken Military Craft Act

Another component to identifying military aircraft through more than causal observation are directives issued by the Underwater Archaeology Branch (UAB) of the Naval History & Heritage Command (NHHC) known as the Sunken Military Craft Act, which still has jurisdiction on all aircraft and other vintage wrecks. Under the Act, the United States maintains ownership of any sunken military craft and its associated contents owned or operated by the government at the time of its sinking, regardless of the passage of time or location. As a result, it is illegal to disturb, remove, or damage sunken military craft, including navy wrecks, as well as foreign government historic wrecks located in US waters, without permission.

The UAB also manages the protection of Navy sunken military craft as, in addition to their historical importance, many of them serve as war graves, carry unexploded ordnance, or may potentially raise environmental concerns. In addition, the UAB maintains a geographic information system and database of over 3,000 ship and 14,000 aircraft wrecks for management as well as prepares nominations for the National Register of Historic Places.



Diving the plane

The challenge in reaching this wreck is not only the depth, but also the fact that it is a small, low profile target sitting on an expansive stretch of sandy bottom directly in the path of the Gulf Stream's northbound current. The very nature of this wreck's physical location makes it extremely impractical to anchor nearby and tie in a downline, as the current over the wreck can be more than three knots at any given time.

To compensate for these factors, diving the wreck entails a live drop. Hitting it square on requires both perfect timing and positioning. If the boat captain does not begin the drop directly up current of the plane, divers will miss to the left or right. A drop begun too late will not allow divers time to descend and they overshoot the wreck; a drop too early can waste precious bottom time as divers drift toward the target.

Visibility on the site can range from more than 100ft (30m) to less than 30ft (9m), and when the visibility is down, divers have even less margin for error. There was hard current and 30ft (9m) visibility on my first attempt to dive the wreck, rendering a twilight world on the bottom. A week later, conditions had vastly improved, with visibility opening up

THIS PAGE: Scenes from the wreck of the Helldiver plane off the coast of Jupiter, Florida; Tony Grogan (owner of Spearboard.com) investigates the wreck (right). This day provided ideal conditions, with seas less than two feet, very light current and water that was a deep iridescent blue from surface to bottom.

Warbird

While this part of the wreck presented some of the more worthy subject matter for imagery, getting some of those shots was also most hazardous.

All around it, like sentries at their post, was a large gathering of lionfish, requiring a few sweeps with my strobe arms to clear a spot to shoot. Getting quilted by even one of their long spines would not be fun, especially with the long deco we would need to perform as part of the dive still to come.

to a spectacular 130ft (40m)-plus, along with a mild current pushing ever so lightly north.

On the descent, my first glimpse of the plane reminded me of a child's discarded toy, with the nose section and propeller off to one side, and the body off to the other. The plane's current position has it pointing almost due south, nose into the current. Hence, it's reasonable to say the weight of the engine (the propeller acting like the flukes of an anchor) marked the spot where the plane may have first settled to the bottom. Over time, the continuous buffeting of the current and corrosive actions of the elements weakened the engine's connection to the airframe, which eventually detached and likely pushed it back to where it now sits.

Mostly intact

For an aluminum aircraft that has been on the sea floor possibly 60-something years, it is still amazingly intact. With the exception of the flaps and parts of the skin having fallen off, both the wings and rear horizontal stabilizers are still firmly attached to the airframe.

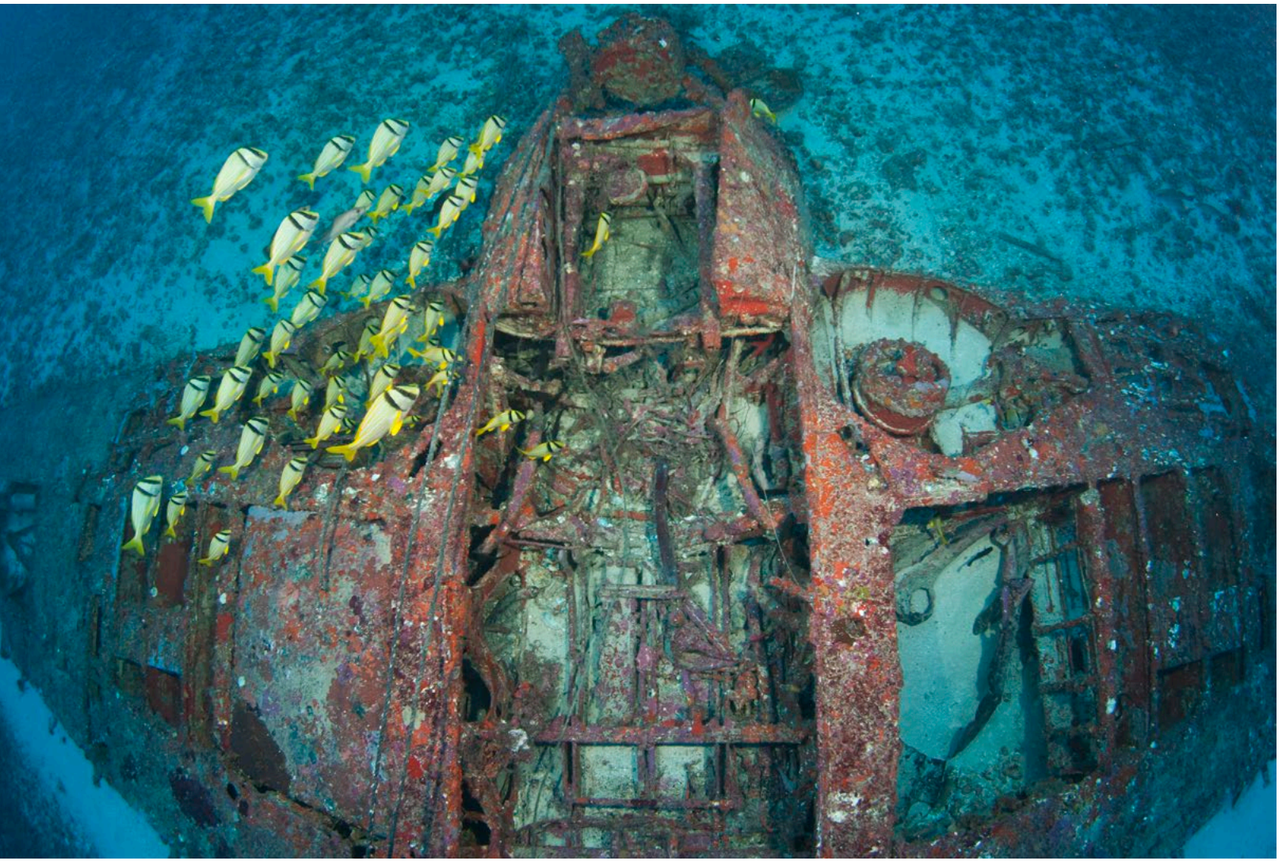
Forward of the cockpit, the shroud, known as the nacelle, which once covered the Helldiver's radial engine, was gone leaving the motor mounts well exposed to the elements and growth. Each pop of my camera strobes revealed vibrant shades of orange with spacklings of deep red produced by years of accumulated growth atop the metal surfaces.

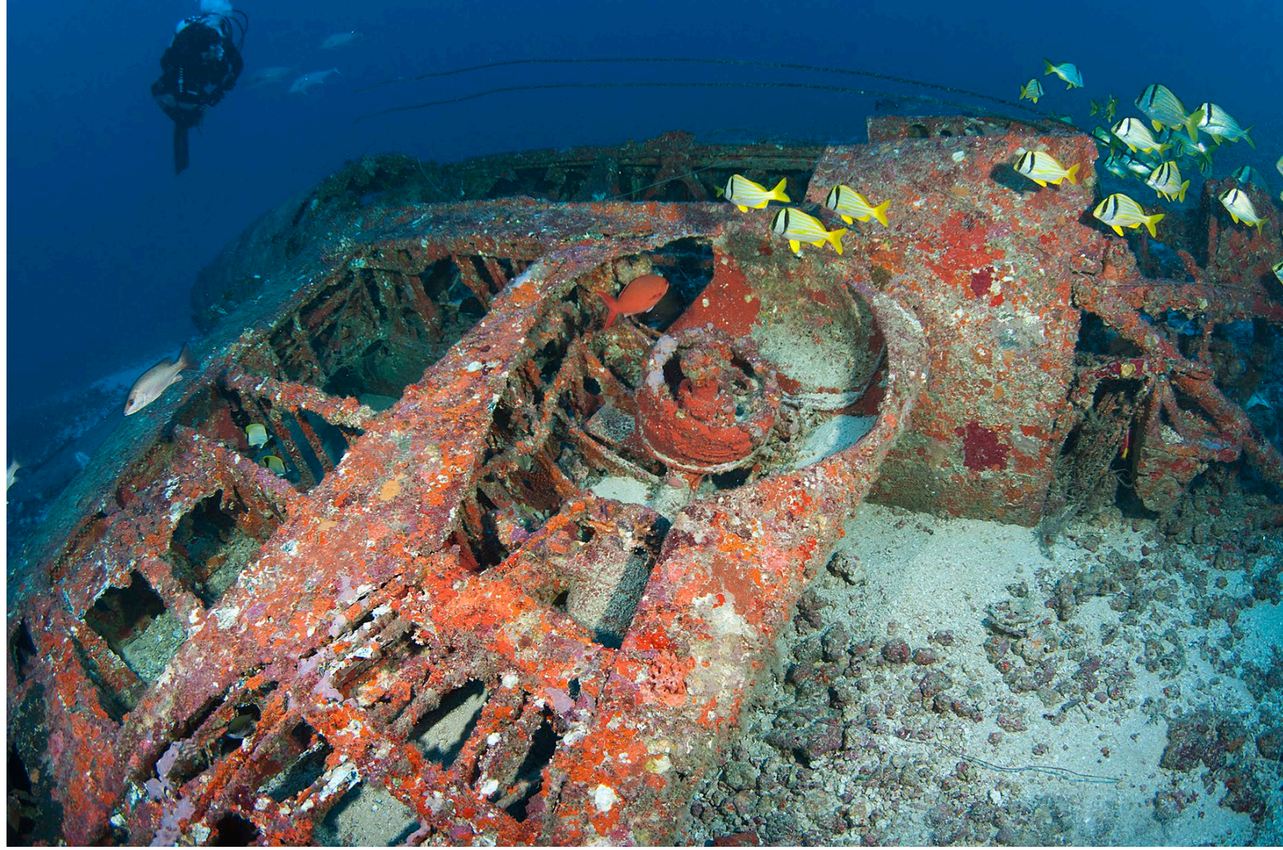
Some 25ft (7.6m) up current from the nose completely inline with the airframe sit the SB2C's engine with its four-bladed propeller still attached.

A trail of Accident Reports

To recap, there were several active air bases up and down the Florida coast during and in the years following

THIS PAGE: Scenes from the wreck of the Helldiver plane off the coast of Jupiter, Florida; My first full glimpse of the Curtiss Helldiver reminded me of a child's discarded toy, with the airframe lying there upside down with SB2C's radial engine and four-bladed propeller (still attached) resting some 25ft up current from the nose of the plane. For an aluminum aircraft that has been on the sea floor possibly 60-something years, it is still amazingly intact.





the Second World War. During those years, every base had lost a few planes to training mishaps and mechanical failures, many of which occurred over water. Without the plane's BuAer number, the next best source of clues to the plane's identity is looking at accident reports (at US$15 a pop) from US Naval Archives.

One of the more compelling reports was an incident involving not one but two SBC-3s, which occurred during a practice run on 24 November 1942, some 40 miles (64km) north of Fort Lauderdale, Florida. The details in the report are a bit sketchy, but describe how the plane piloted by Ensign Louie H Steman became interlocked with a second plane as a result of a mid-air collision at an altitude of 1,000ft (305km).

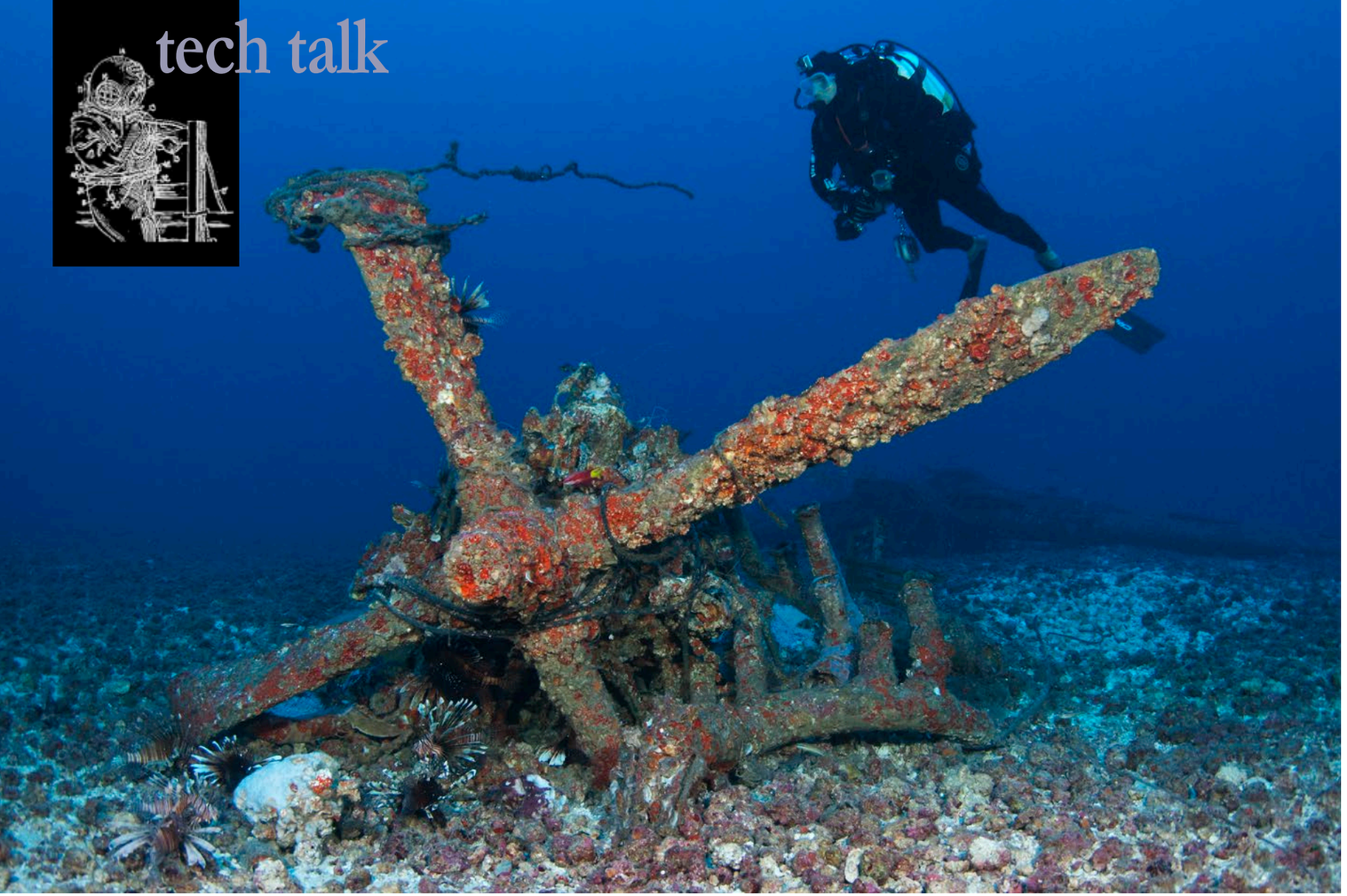
While the occupants of both planes were able to parachute to safety with no serious injuries and "remained afloat by means of life jackets," the report states: "Both planes were definitely out of control after the collision."

Going on that last piece of information, the likelihood of either plane remaining even partially intact after that kind of mid-air collision would be slim. Furthermore, the Curtiss SBC-3 was a biplane rather than a single-wing aircraft, so we can safely rule them out.

Another report involved an SB2C-1C lost on 16 January 1945, when Lt. John J Gostovny lost control shortly after takeoff. It was later determined that one of the plane's wing tips may have clipped a tree at the end of the field, in the dark, causing the plane to bank sharply and cartwheel into the neighboring orange grove. An accident like that would have severely mangled both the airframe and wings.

Looking over the Helldiver's skeletal remains, one could imagine the pilot had performed a wet landing (think US Airways Miracle on the Hudson), as evidenced by the intact airframe and wing, and the fact that the landing gear was still retracted. This brings us to our last current lead—from an accident report filed 3 April 1945. An SB2C-3 model Helldiver, piloted by Lt. T.H. Mewborn made a "wheels up, flaps up" forced landing during his approach into Morrison Field, known today as Palm Beach International Airport.

Among the Helldiver's less-than-satisfactory handling characteristics is that during a landing approach, the plane would come dangerously close to being out of control. This would sometimes force the pilot to abort the landing and gun the throttles to regain speed and lift. But this action would sometimes cause the plane's nose to pitch too sharply upwards, causing it to stall over the carrier deck. Other times, the lack of control during approach would cause the plane to stall directly onto the deck. In addition, there were frequent maintenance problems with the Curtiss-Electric propeller, which used a complex hydraulic system



THIS PAGE: Scenes from the wreck of the Helldiver plane off the coast of Jupiter, Florida; With the exception of the flaps and parts of the skin having fallen off, both the wings and rear horizontal stabilizers are still firmly attached to the airframe.

Warbird

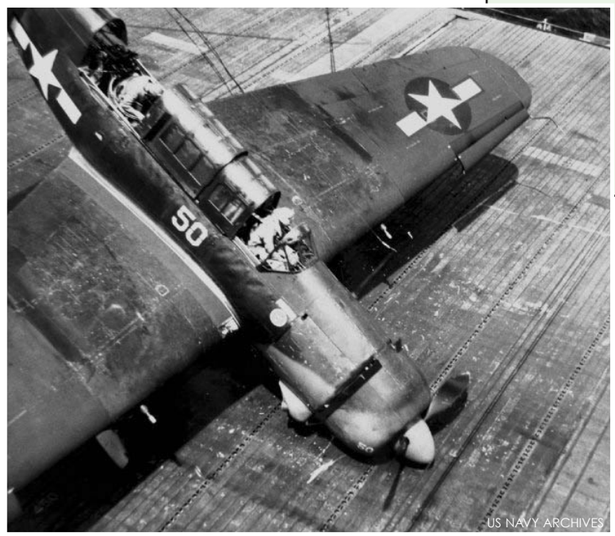
that caused the pitch of the propeller to go to near zero upon failure, thereby causing the blades to become ineffective in pulling the plane forward.

Evidence of collission

Studying the sharp bends in two of the wreck's four propeller blades, with the third exposed blade still straight, it's obvious this plane hit something hard. In most instances when a prop driven aircraft performs a wet landing, the blades are bent backward, sometimes with little more than subtle curvature to the blade. When the blades hit something harder like earth, the bends are more abrupt, sometimes at sharp right angles as they are here. Without being able to see the condition of the fourth blade, as it is buried deep in the bottom, there is no way of knowing if it too is bent or straight.

Taking in the very visible bends in the propellers and that the fact that landing gear is still retracted and tucked in the wings, it would be conceivable to say this plane could be the same one that crash-landed at Morrison Field in 1945. Other supporting evidence is that control of the airfield had changed hands from the US Army to the US Air Force to the City of West Palm Beach around the turn of 1959 to 1960. During that timeline, several derelict aircraft from the field were supposedly loaded on a barge and dumped well offshore of the Palm Beach Inlet.

Of course, all this is speculation. There is the fact that the military did lose several planes during and for a few years after the war off Florida's East Coast; plus, we have not exhausted the list of accident reports still under file. Without a solid piece of evidence, like the plane's BuAer number, we will never know for sure, leaving this warbird mystery wreck, and many others still unsolved. ■



A Helldiver that suffered a face plant following a failed landing on a carrier deck

CURTISS SB2C HELLDIVER

— The history of the Curtiss Helldiver is not particularly charmed.

Originally, the Helldiver was a carrier-based, dive-bomber designed by the Curtiss-Wright Corporation to replace the Douglas SBD Dauntless. While the Dauntless had the ability to carry a considerable array of armament, its primary setback is that it was relatively slow, which created limitations as a carrier-based fast strike bomber. Although the first Helldiver prototype was introduced on 18 December 1940, the plane suffered a series of design issues warranting numerous changes to the airframe, which included lengthening the fuselage and fitting it with a larger tail. Even with the re-designed airframe, the Helldiver bore a litany of mechanical faults. It was seriously underpowered, had an unreliable electrical system and a shorter range than the SBD (the plane it was intended to replace). These problems delayed final delivery of the aircraft until 1943.

In spite of the fact that it had a top speed of 475km/h (295mph)—faster than the SBD it replaced—and a propensity to stay in the air after receiving a good bit of damage, the SB2C was not a well-liked aircraft with flight crews. It handled poorly whenever its airspeed was dropped below 90 knots, an especially problematic trait for carrier landings, as the plane's approaching airspeed needed to be around 85 knots. Mechanical issues also plagued the Helldiver, giving rise to a number of not so endearing nicknames, such as the Big-tailed Beast or the Son-of-a-Bitch, 2nd Class—playing off the SB2C service designation.

It wasn't until 1944 that some of the SB2C's chronic handling issues were resolved through the introduction of the R-2600-20 model 1,900 HP Twin Cyclone engine, coupled with a redesigned Curtiss 4-bladed propeller. Yet despite its rocky start and less than favorable reception, the Helldiver wiped out more Japanese targets than any other aircraft in battle.

During the same period, the SB2C Helldiver was amassing a fine combat record (during the last two years of the war in the Pacific). Back home, the Truman Committee's investigation on the Helldiver production issues (encompassing more than 880 changes) ensued into a scathing report, and the eventual beginning of the end for the SB2C Helldiver program. Following the war, the US Navy kept what remained of their SB2C squadrons in active service up to 1947, then moved them to naval reserve units for another three years before decommissioning them in 1950. ■

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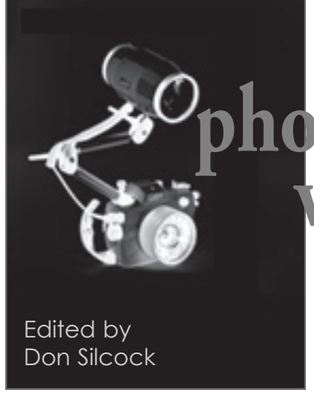

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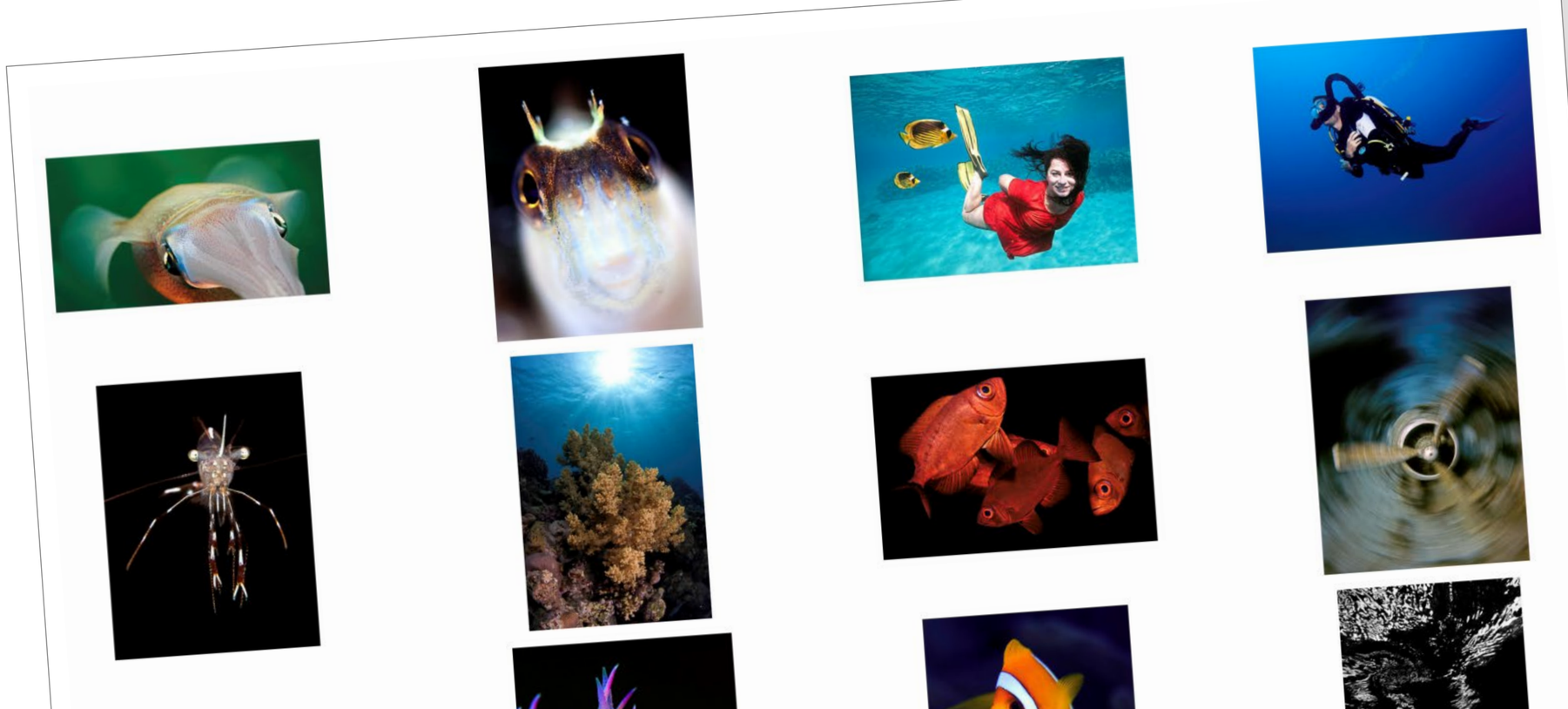
Edited by
Don Silcock



Portfolios

Presenting Your Work

Text and photos by Rico Besserdich

The portfolio is the personal visual flagship of a photographer, and in some sense, the final step in presenting one's own photographic work. Success and expressiveness of a portfolio depends on many factors. Rico Besserdich provides tips and suggestions on how to approach the difficult task of compiling a good portfolio.

Before it is possible to find the right solution, the question needs to be clearly understood. For that reason, the first step is to shed light on the question: What is a portfolio?

The term *portfolio* (from the Latin: *portare*, meaning 'carry', and *folium*, meaning 'sheet') generally describes a collection of objects of a specific type. Neither the nature, nor the type is generally predetermined, which makes it a relatively general term.

This delights bankers, sales specialists and artists alike, as the term portfolio is used in the financial world, marketing, sales, education, information technology, production management and also art and design. However, we would not expect that an investment consultant of a bank will present us with artistic pictures when we ask to see a portfolio.

In the world of arts, in which we boldly see ourselves as underwater photographers for now, the portfolio is a compilation of the best and most relevant work and projects in which we have been involved. The purpose of a portfolio is self-promotion and job application, or, to say it bluntly—to show what you can do.

Already in the Renaissance, artists and architects presented their portfolios to apply for new commissions but also to show how they had developed their skills over time. Carrying all these sheets of paper was preferably done in a folder.

Portfolios in the form of folders, with printed or drawn content, still belong to good form these days, but digital data carriers (CD, DVD, USB stick) and even the Internet (portfolio website) have found their place—at least as additional alternatives.

For photographers, the portfolio, whether stored on DVD or displayed on a website, is the final selection that

Wrong: Something of everything... and still nothing. Every single picture is good, but the picture sequence and the overall concept of the portfolio are inconsistent.

Portfolios

Fish portraits. A relatively simple concept for a portfolio, which can still work.

represents the essence of one's own photographic work. Only the best pictures are presented—at least, that is what is said. Of course, it is never really final, as good portfolios will change over time. They can grow, sometimes shrink or their content can even take completely new forms. In short, a good portfolio is never finished and never perfect. But this should not be an excuse to not even start thinking about the compilation of a portfolio.

When it comes to making a "best of the best" choice of images, many photographers, no matter if they are amateurs or experts, find themselves confronted with the major difficulty of being spoilt for choice. This agony can be decreased with some preparatory thoughts and a few small tricks.

The best place to start is the availability of good picture material—underwater pictures in this case—and following my article, "Image Selection," in the last issue, you should now have a selection of good photographs. This selection is by far not yet your portfolio; the portfolio will be the ultimate essence of the selection. And just as for the art of liquor distillation, there are several important steps of work to do and things to take care of to prevent everything from blowing up in your face and making you go blind.

Number of images

Can it be a bit more than 20? No, it can't. A portfolio with 100 pictures, or even more, tests the patience and the attention span of the viewer. Instead of letting pictures make their own impression in the way they deserve, so the viewer can enjoy them and develop his or her own thoughts about them, such a monster portfolio would be too much to digest and would most likely not even be viewed halfway. Our best underwater pictures certainly deserve better.

Please always remember: With your portfolio, you, as a photographer, must show the viewer through your images, "This is me", and this presentation is used to evaluate your photographic, and perhaps, artistic performance.

There are people who can formulate the nature of something clearly, understandably, and in an appealing way, with a few words or sentences, and then there are others who talk for three days and still have not said anything meaningful. The same applies to photography: Less is more. Quality over quantity. Eloquence over sensory overload. Therefore, 12 to 20 pictures is enough for a portfolio. As I said, we are talking about the essence of your work, not its totality.

The ones who are still left with a couple of hundred pictures after intensive photo selection might see a seemingly insurmountable challenge in choosing only 20 out of all these. It is indeed not an easy task, but nevertheless an important step in defining yourself as a photographer—not only to the public, but also to yourself.

What should you show?

Beginners often tend to overload their portfolios. There are super-macro pictures next to wreck images, color explosions next to black and white images, photos of slightly dressed underwater models next to images of heavily laden tech divers, night diving photos next to shallow water images flooded with light, and a whale shark followed by a skeleton shrimp a millimeter in size.

The completely comprehensive approach of "a lot of everything" portfolios is the effort of the photographer to show a diverse spectrum of subject matter, situations and sometimes even techniques all in one portfolio. There is nothing generally wrong about this approach, but using it depends on the audience for whom the portfolio is made. More about this later.

Artistic license (or obstinacy!) aside, the classical school and craft of photography has certain basic principles that deter-

Light plays. A (demo) portfolio that is solely dedicated to natural sunlight under water. Such portfolios need time to evolve, but it is also a pleasure to follow a specific photographic concept during dives.












mine how the content of a photographic portfolio is supposed to be realized. Although none of it is set in stone, the knowledge of these basic principles facilitates the job of setting the theoretical and conceptual structure of the portfolio in the right direction.

The basic idea is to have a concept, a common ground, a red line, a theme, which shows the viewer the intention (and the ability) of the photographer, without long explanations.

Here are some standard thematic emphases for inspiration:

Specific photographic technique
Pan-photography, panorama photography, high key, low key, composite, long exposure (just to name a few) are photographic techniques, which each can form the basic theme of a portfolio (but not all together).

Photographic style or field
Landscape photography, portrait photography, black and white photography, macro photography, abstract photography, photojournalism and nude photography are a few examples that are perfectly suited as portfolio concepts. This list does not mention underwater photography as a theme. More about this in a moment.

Compositional concept
Special compositional concepts are also suitable as a red line that guides and leads the eye of the viewer of a portfolio. Employing the rule of thirds is fundamental to the craft of photography in general, but compositional (and intentional!) use of color contrasts, shapes and structures, or even following the Chiaroscuro concept, can each be strong themes for a portfolio, which will also be appreciated by experts.

A specific message
War, love, emotions and special events, but also unusual and unexpected situations, are very well-known in the world of photojournalism. But nature photography (including underwater photography) can also have strong visual messages, which can offer a special value to a portfolio. For inspiration, have a look at the portfolios of the MAGNUM photographers (www.magnumphotos.com). You will see that every single portfolio has a strong message, which does not need further explanation in words. Meaning and message explain themselves to the viewer visually, and there is absolutely no reason not to try the same in underwater photography.

Special equipment
Maybe the word 'unusual' suits this category better than the word 'special'; otherwise, any underwater equipment could be defined as special, making it unnecessary to do anything more to make a portfolio unique. But just as the tilt-shift lens is a relatively common tool for architectural photographers, the same is true for underwater photo equipment used by underwater photographer.

What would be considered unusual (or very unique) photo gear today, would be specific cameras such as large format or 3D cameras, as well as certain lighting equipment or very exotic lenses such as magnifier lenses. Examples of super-niche photography include infrared photography, molecular photography or fluorescence photography.

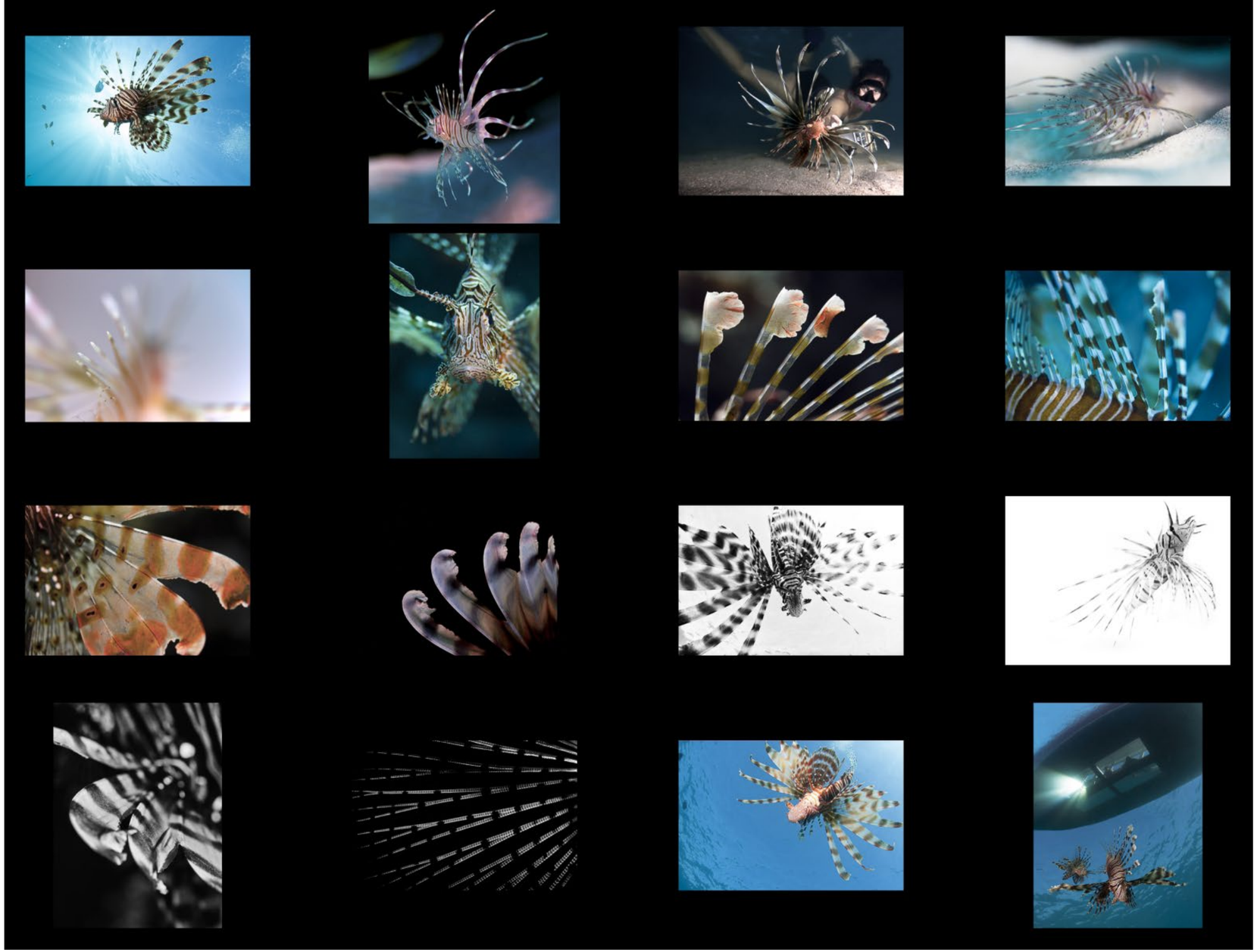
Whether this makes sense or not cannot be answered here. What is certain is that the use of unusual equipment is suitable as a concept for a portfolio.

Underwater imagery as a theme
Is underwater photography a photographic discipline that can serve as the only concept of a portfolio? This question, which is critical to the creation of a successful portfolio, cannot be answered generally. However, there are two different points of view on the topic.

Regarding requirements, subject matter, techniques and equipment needed, underwater photography these days can certainly be considered its own photographic discipline. This should not be interpreted in any way that

photo & video

Photographic red lionfish studies as portfolio. A very specific subject and its interpretation in diverse ways.



"everything possible under water" is an accolade for a successful portfolio. Thousands of quite similarly looking portfolios of underwater pictures illustrate this point.

Anyone who wants to define himself or herself as an underwater photographer, stand out from the crowd and receive recognition from photography experts may consider a second thought: Underwater photography is and remains a small niche in the world of photography itself. Even if the medium of water creates special optical conditions, photography is still photography, and as such, follows certain principles, and in some ways, even rules.

All in all, underwater imagery, as a theme, or as the only concept of a portfolio, is no longer sufficient these days.

Subcategories

In addition to the basic thematic concepts of portfolios mentioned above, underwater photography has developed a diverse range of subcategories as well. Whether it is macro, super-macro, underwater models, sharks or wrecks, there are specialties everywhere. And even if an expert underwater photographer can move through these categories with confidence, the most successful ones still have something in common: They have specialised in a very specific area and developed their own, recognizable style through several years of consolidation of the topic. Of course, such a unique style does not have to be within the classic subcategories of underwater photography.

Skill and depth

Photographic skill is not necessarily the only quality feature of a portfolio. At a certain level, it is just expected that a photographer understands his or her craft and knows how to handle the tools. Not many laurels can be reaped in that way.

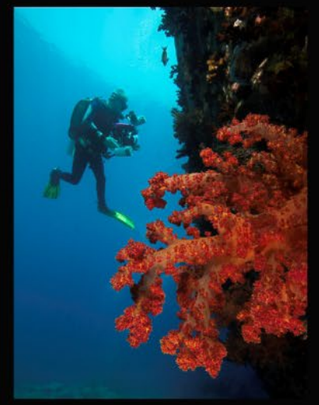
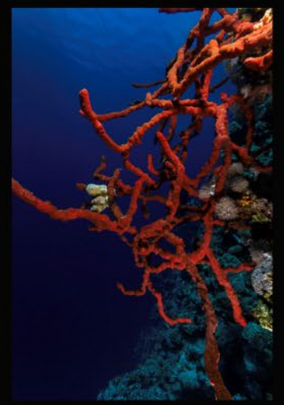
Successful portfolios often are the ones that demonstrate the photographer's deep understanding of the topic and that he or she knows how to combine the result of conceptual planning, profound thinking, preparation, execution and refinement. It is the extra effort and the intense, self-reflective analysis of the topic over an extended period of time that makes the difference. You can trust me—these efforts are recognized and rewarded.

Define your target group

Here, we talk about the important questions regarding the audience for whom the portfolio is made, who will see it, and what your purpose is (what is all of it for).

Photographers who want to do more than just archive nice memories and perhaps have more specific interests (to publish, sell, or





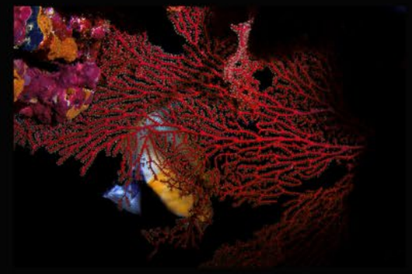



exhibit images) should think clearly about their target group when building their portfolios.

An editor of a dive magazine will have different expectations and requirements than, for example, a friend at a dive club. The curator of an art gallery or of an illustrated art book will not be keen on working with classical photojournalism (e.g. documentation of marine life). Animal welfare and wildlife conservation organizations may miss the connection to the topic if you present them with images of colorful fish. On the contrary, colorful fish can be a great way to attract private customers as buyers who want to put the pictures on the walls of their homes.

And friends in your social networks may like the unique shark picture from the Caribbean just as much as kittens on a couch, but they will not buy any.

What you can see here is that it is somewhat impossible to make one portfolio to fit everybody. Therefore, the important question is: Who is your target group?

You cannot get this right with explanations. Please remember: A photographer is evaluated upon his or her photos, not upon written explanations. This leads us to the next point—text descriptions.

Text description

A short introductory text for the portfolio is acceptable, commonly employed and appropriate in order to let the viewer pick up the red line or theme you are creating. Two to three short sentences in regards to the content (title, topic, concept) and a short biography of yourself is sufficient. The pictures should tell everything else that might be said.

Technical details about the camera, underwater housing, strobes or even camera settings are just as inappropriate in a portfolio as explanations about how extremely complicated it was to take this or that shot. Also, extensive naming of sponsors should be handled with care.

Here are two examples:

Right: *Joe Bloggs*
The Four Seasons
The four seasons at Lake Constance. A photographic underwater journey over time, created 2012-2015. 16 photographs in 4:3 format.

Joe Bloggs is a photographer who specializes in the underwater world of domestic lakes in Germany. His unique photographic passion is dedicated to the changes of the underwater realm during the different seasons.

Wrong: *Underwater pictures of my last Red Sea tour. Woah, what an extreme current, but thanks to the help of Friedl (visit his diving school, Friedl-Diver, at dive-and-survive-with-friedl.com—it's great!) I could finally take my long-desired pictures [#picsaregreat] with my Wakromax FZ7000 [#wakromaxmanagesit] camera and my Troll-90 flash [#lightinthedark]. Many thanks also to Maxi, Seppl, Bee and Kalle! I will be back soon and then we can take even more great pictures! Please click on my sponsors' links and order my calendar!!!*

Portfolios

The color red as portfolio theme. There are endless possibilities and ideas for interesting concepts.

Beginnings and endings

—Sequencing pictures

The portfolio, as a whole, also represents a composition—at least, that is how it should be. This can be achieved through the arrangement and sequence of the single images in the portfolio.

The sequence of pictures has a significant effect on how the viewer perceives and evaluates your work as a whole.

Your portfolio tells a story and leads (i.e. the red line!) the eyes and the mind of the viewer through the photographic world you have created. This can be realized through real statements (photojournalism) or more abstract ways, e.g. colors, objects, harmonies and disharmonies.

You are the composer and the conductor; it is all in your hands. But no matter if it is marching music or a solo for piccolo flute in D major, it all starts with a flourish!

Your best or most important picture should not be hiding in the middle but be the first one in the portfolio. Start with a

photo & video

Nearly always part of a dive, but hardly ever (photographically) considered are other underwater photographers. The documentation and creative interpretation of the topic of underwater photographers can be fun during work and offers material for a portfolio that stands out from the masses.

bang. In addition to some ringing in the ears, the viewer immediately gets curious about the following pictures. Portfolios that start weak are often not even viewed to the end.

Then the other pictures follow. As in music or literature, you can build tension or tell short stories. However, one should try to prevent overly extreme changes. Therefore, pictures that have color harmonies as a motif should not suddenly be interrupted with a wreck photo, high in black and white contrast, for example. Nor should an image series on the underwater worlds of coastal regions be interrupted with a dark blue picture of deep sea diving.

Get the picture? It is not only the single image, but also the entire portfolio as well as the arrangement of its contents that require thought in regards to harmony, rhythm, tension and compositional aesthetics. The effort is worth it, and you will grow as a photographer with the task.

End with a bang

Your second best picture (or what you think is the second most important) should come at the end, as it creates the crowning glory of your portfolio. And if the viewer then screams for more, then the portfolio is a good one. Because with a portfolio, you are not showing everything you've got (or are able to do), but only the essence of your work—an essence that leaves the viewer longing for more. It comes in handy here that in addition to the 12 to 20 pictures in your portfolio, you have another few hundred or more fantastic shots available in your archive.

The goal should be to awaken interest in people for your photographic work and to receive the recognition one is due.

Get an outside opinion

It is not a secret that even the most expert and renowned photographers have difficulties in extracting a portfolio from their vast photo collections. That is aggravated by the fact that the creators themselves (in this case the photographers) are often not the best judges to evaluate the works neutrally and objectively.

There have been many cases in which masterworks were hidden from public view for a long time by the photographer, as the images were not considered worth showing, and only got discovered decades later by coincidence, and unfortunately, often after the photographer had already passed away.

If you are really serious about publishing your work, show your portfolio, or a shortlist of your pictures, to one or more people whom you trust and get their opinions and feedback—before the publication date, of course. These people could be experts in the field, but it is not necessary. Even the opinion of relatives, neighbors and friends can be valuable in seeing things from a new perspective, maybe rethinking things, and finally reaching your personal photographic "This is me" statement.

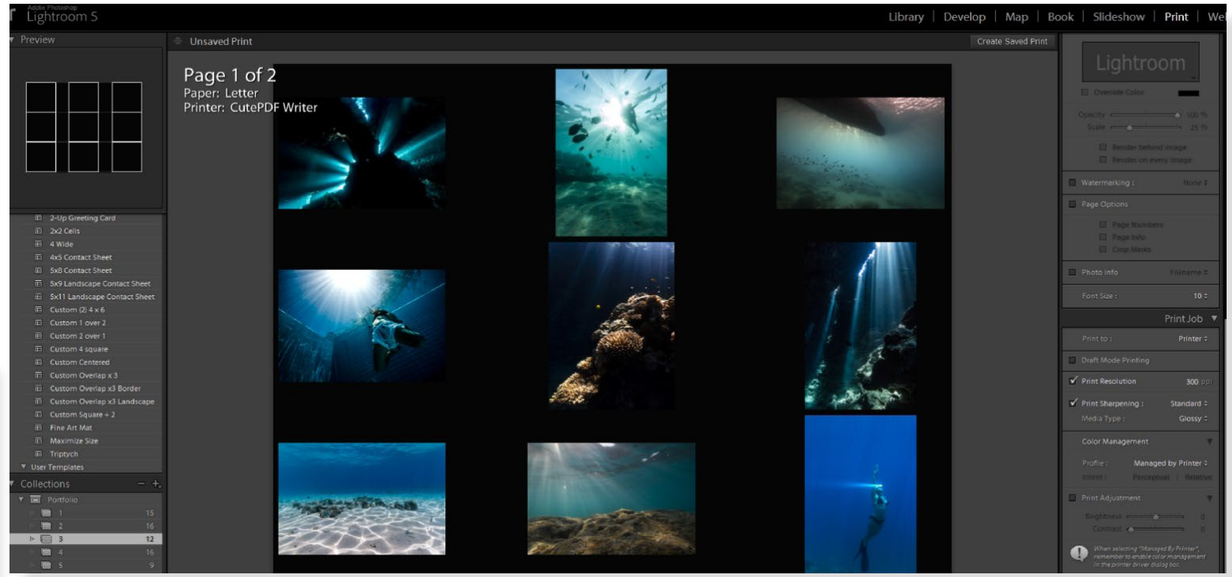
The art of presentation

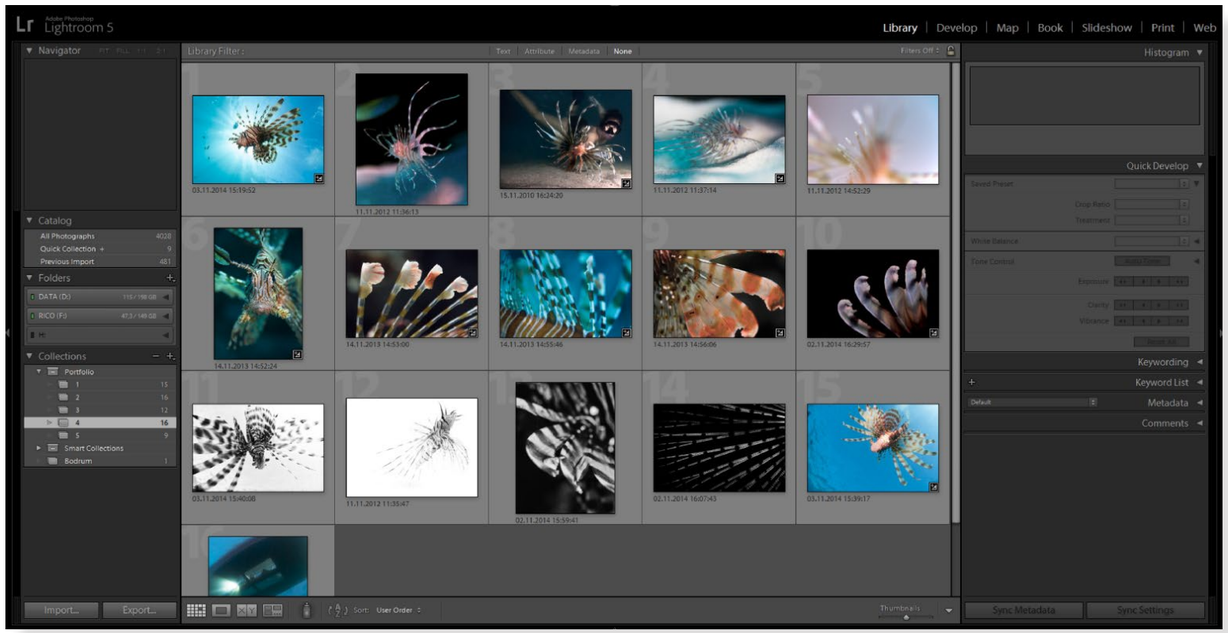
Once all the work is done, the next step is to think about a way to present the portfolio. What is commonly used, as it is technically easy to do, is an online portfolio—either on one's own website, or on a specialized internet photo platform such as PhotoShelter, 500px, Wix, and Flickr.

These portals often promote images to large audiences, providing one the chance to reach millions of users. What they usually do not tell you is that most of the users are also hopeful photographers with their own goals. This does not have to be a negative, but whether or not you use these portals depends on who you want to reach with your photographic work. In terms of outreach, quality counts over quantity as well. Promises that these photo platforms will attract endless numbers of magazine editors, art curators, gallery directors, and even art collectors, should be viewed with skepticism.

It is not possible to completely forego the Internet anymore, as this medium has already significantly shaped the way people view and perceive pictures and will keep on changing how people see images in the future. Like

The print module of Lightroom offers the option to summarise picture selections as contact prints. They can be printed directly or exported as a graphics file.





Adobe Photoshop Lightroom offers several useful tools for the compilation of a portfolio. For example, selections can be summarised in so-called collections. Picture sequences can be changed and of course all editing functions are still available. You can create any number of collections (without moving or removing original pictures from their storage location). Practical for the development of different portfolio themes.

it or not, a standard has been created, and one has to join the game in some way—in the very least, with your own website, which should also include your portfolio.

One possible step to take in order help your portfolio presentation stand out from the crowd, is to take a step backwards, and go old school. Compile high-quality prints of your images in archival sleeves into a quality art folder or portfolio case. Folders can come in many different colors, formats and materials, and the "good old way" offers many creative possibilities in presenting your portfolio in an effective way. In the end, nothing, and I mean really *nothing*, can compete with high-quality prints.

Consider how much effort, dedication and also costs you have incurred in presenting your work in a fine portfolio. And, indeed, you are convinced it is a really good portfolio. At the end of this long street, do you want to see bored people on a couch, in the metro, or in an office, skipping through the essence of your photographic work in seconds, and acknowledging your passion with a "Like" on Facebook, at most, and then move on to the cute kitten pictures? Your work deserves more. You deserve more.

Anyone who wants to go far as a photographer may be well-advised to appreciate the good old folder (a photo book or album is also good) and not show it to the masses, but rather to the right people. The ones who make this effort will receive appreciation and acknowledgement for it—given that the portfolio is good.

After the flourish

As I have already mentioned, a portfolio is never really finished and never perfect. It can and must be developed further, just as your own photographic expression is developed further.

Photographers with a wide range of interests may see certain predefined basic thematic structures of portfolios as restrictive to their own artistic license, but nowhere is it written that a photographer should only have one portfolio. ■

Rico Besserdich is a widely published German photographer, journalist and artist based in Turkey. See: ***www.maviphoto.com****.*

Lightroom's slideshow module is useful to test picture sequences as simulation. The slideshow can be played directly in the program and provides important insights about which sequences are good or where a certain picture might be better placed in another position.

photo & video

Edited by
Don Silcock

PRODUCT SHOTS
COURTESY OF THE
MANUFACTURERS

Sea&Sea EM5 II Housing

Sea&Sea has released its new housing for the Olympus OM-D E-M5 MII mirrorless Micro 4/3 camera. The MDX-EM5 MkII housing is made from marine-grade aluminium and is compatible with Sea&Sea's ML and NX ports (when used with an adaptor). The housing features an external port lock and a leak detector is available as an optional extra. The NA-EM5II housing is available now.

Ikelite 5DS & 5DS R Housing

Ikelite has released their new housing for the Canon EOS 5DS and 5DS R cameras. While both cameras are identical to the EOS 5D Mk III Canon, the new 5DS models use a new and different TTL protocol, which causes Ikelite DS strobes to overexpose by about two stops when used in TTL mode. Ikelite has released the new housing with modified internal TTL circuitry to correct the overexposure and are offering an upgrade for owners of existing 5D Mk III housings who want to use the new 5DS models. The Ikelite 5DS housing is available now at a retail price of US$1,800.

Recsea Sony AX Housings

Recsea has announced the release of two new housings for the Sony AX series 4K camcorders. One version of the new housing features a window that allows the use of the LCD screens on the AX30/AX33/AXP33/AXP35 camcorders when framing. The other version uses the viewfinder on the AX33/AXP33/AXP35 models and features a 45-degree magnifying viewfinder on the rear of the housing. Both versions are available now.

GoPro HERO4 Session

GoPro has released its new HERO4 Session camera. GoPro states that the new HERO4 Session is 50 percent smaller and 40 percent lighter than the standard HERO4 Silver and Black units, and is waterproof t0 33ft (10m) without an extra housing. The HERO4 Session will record video at 1080p60, 720p100, and 1440p30, plus still images at 8MP, with burst and timelapse features. Controlled using a single button, expanded controls are also available via the GoPro app or smart remote. The HER04 Session is available now at a retail proce of US$400.

Ikelite RX100 IV Housing

Ikelite has released its new housing for the Sony RX100 IV compact camera. The housing features a slide-in camera tray that is front loading, plus a redesigned spring-loaded rear dial control. Ikelite's standard polycarbonate construction means that the camera's Wi-Fi function can be used to download images at the surface without having to open the housing.

photo & video

Edited by
Don Silcock

PRODUCT SHOTS
COURTESY OF THE
MANUFACTURERS

Sealux HDFS7 Housing

German housing manufacturer Sealux has announced its new unit for the Sony PXW-FS7 4K Super 35mm XDCAM camcorder. The Sealux HDFS7 housing is compatible with the Sony's built-in LCD monitor or can be used with an external monitor. The HDFS7 housing provides full manual control of all the Sony camcorders functions and also provides access to its right hand keypad.

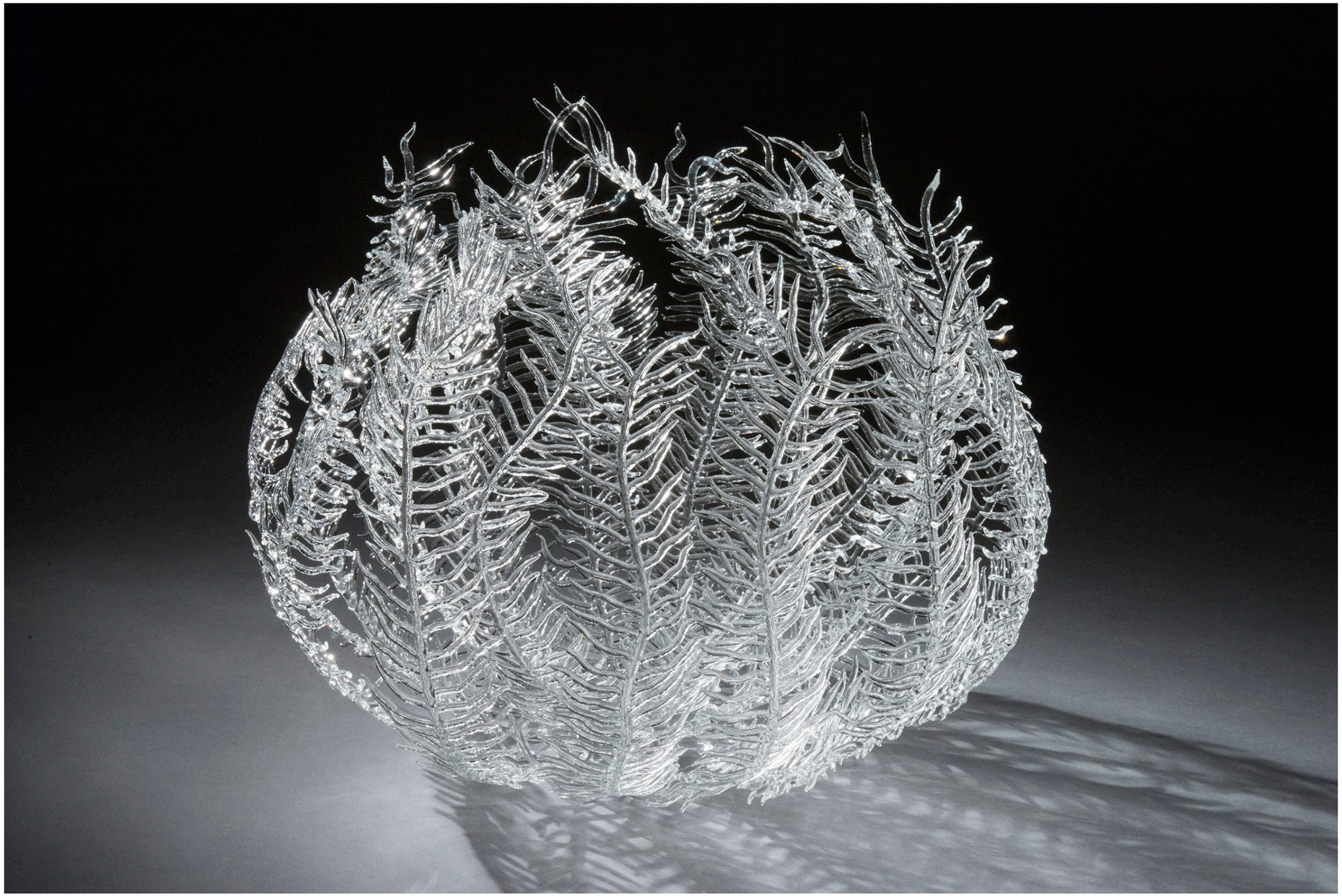
Sea&Sea YS-D2 Strobe

Sea&Sea has released its new YS-D2 strobe, which features a guide number of 32, which reduces to 24 with 100-degree diffusers and 20 with 120-degree diffusers, and DS-TTLII, slave TTL and slave manual modes. The YS-D2 is rated with colour temperature of 5,250°K, a recycle time of 1.5sec and up to 200 flashes from a set of four NiMh batteries. The strobe can be triggered by either a Nikonos cable or through fiber optics. The rear control dials now glow to make them easier to see underwater, plus the YS0D2 provides an audible confirmation when a TTL exposure has been successfully made. The YS-D2 strobe is available now at a retail price of US$720.

Nauticam NA-RX100 IV

Nauticam has announced the release of its new housing for the Sony RX100 IV compact camera. The new housing is made from marine-grade aluminum and provides access to all of the RX100 IV's controls, plus it features a mechanical shutter release extension to allow the housing to be used with gloves. The flat front port is provided with a 67mm thread and strobe triggering is enabled using dual fiber-optic bulkheads. The NA-RX100IV is available now at a retail price of US$995.

Emily Williams



P O R T F O L I O

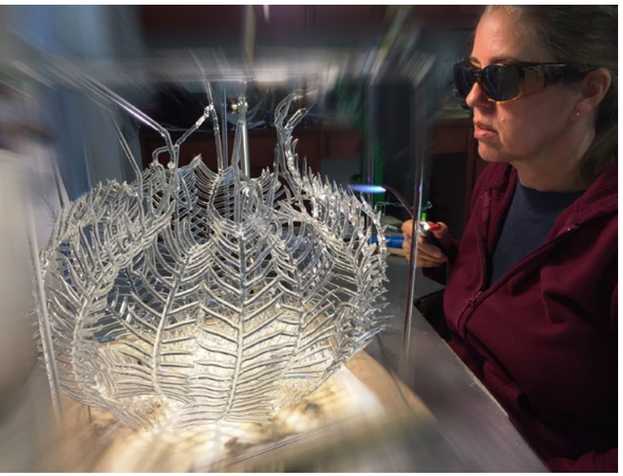
portfolio

Coral Skeleton, by Emily Williams, 2013. Flameworked borosilicate glass, 20 x 22 x 10 inches

PREVIOUS PAGE:
Glass Seaweed, by Emily Williams, 2014. Flameworked borosilicate glass, 20 x 20 x 20 inches

Text edited by Gunild Symes
All artwork and photos by Emily Williams

American artist Emily Williams creates delicate, intricate glass sculptures inspired by complex forms found in nature, including the sublime structures of corals and marine life as well as dynamic shapes water, itself, can take.



The artist, Emily Williams, working on the glass sculptures *Glass Seaweed* (top) and *Feather Star* (bottom)

X-RAY MAG: Tell us about yourself, your background and how you became an artist.

EW: I can remember my first painting from when I was about four years old. All through my years, I can remember every single thing I ever created as a child.

I was very lucky because my father was an artist and also a neuroradiologist. He could make drawings, paintings, glass sculpture, architectural design, and sculptures of the brain. I watched him, from an early age, make wonderful paintings of water scenes from around Reedville and Tidewater, Virginia. I often became involved in his projects.

My father spent his whole life growing up around the Chesapeake Bay and Reedville in Virginia. So growing up, that is where we spent a lot of time. We always lived on the coast, whether it was Tidewater, Virginia; Huntington Beach, California; or on Mobile Bay, Alabama.

Being on the water is just a part of my soul really. I especially loved the swamp environment of Alligator Bayou on Dog River in Mobile, Alabama. My parents lived on Alligator Bayou in Mobile County for 20 years. Some of the alligators could be really huge! Dog River gets its name from the alligators because they bark at night. I would like to live in a swamp again.

My parents always encouraged me to pursue art. I attended Virginia Commonwealth University and received my bachelor of fine arts degree in sculpture. I then pursued my master of fine arts degree in sculpture at Washington University in Saint Louis, Missouri. I had so many great professors in my life that also encouraged me to pursue sculpture. I think some people are just wired to be visual creators. Sculpture is all I have ever wanted to do in life.

X-RAY MAG: Why coral and underwater life forms? How did you come to these themes and how did you develop your style of glass sculpture?

EW: I think corals are just some of the most beautiful things on earth. I am awe-inspired by the variety of different species. Even within each species there are still so many variants! I especially love the different patterns such as the meander pattern of brain coral. I am intrigued with the whole idea of the "open" coral. This transforms a coral into a hairy mound!

While I currently work in transparent glass, I have a lot of

Water Burst, by Emily Williams, 2013. Flameworked borosilicate glass, 12 x 10 x 10 inches

Emily Williams

plans to explore color in future sculptures. I am especially interested in exploring the brilliant, bioluminescent colors found in many corals.

I have always been a little frustrated by the opacity of so many sculptural materials. I want to play with light and luminosity. There is something magical and transformative to the spirit when viewing transparent glass. When I first began working in glass, I was doing cast glass and pâte de verre [*ed.—a kiln casting technique using glass paste of finely crushed glass (frits) applied inside a mold, according to Wikipedia*]. But I found the long, drawn out processes of mold making too time consuming. I wanted a glass working process that gave me instant results. The flameworking process allows me to create forms directly in glass using a hand torch.

I have a wild imagination for things ested in a lot of plant forms, so I am particularly drawn to sea life that resembles plant forms such as seaweed, anemones and feather stars.

X-RAY MAG: What is your artistic method or creative process? How do you create your artworks?

EW: I use a special type of glass called "borosilicate" glass. People use boro everyday in their life. It's also called Pyrex. This type of glass is used in sculpture. Once I mastered the glass hand torch and kiln annealing cycles, I could easily imagine the potential. Clear borosilicate is so beautiful! It looks a lot like water. I have always loved the patterns, textures, and colors of different ocean life forms.

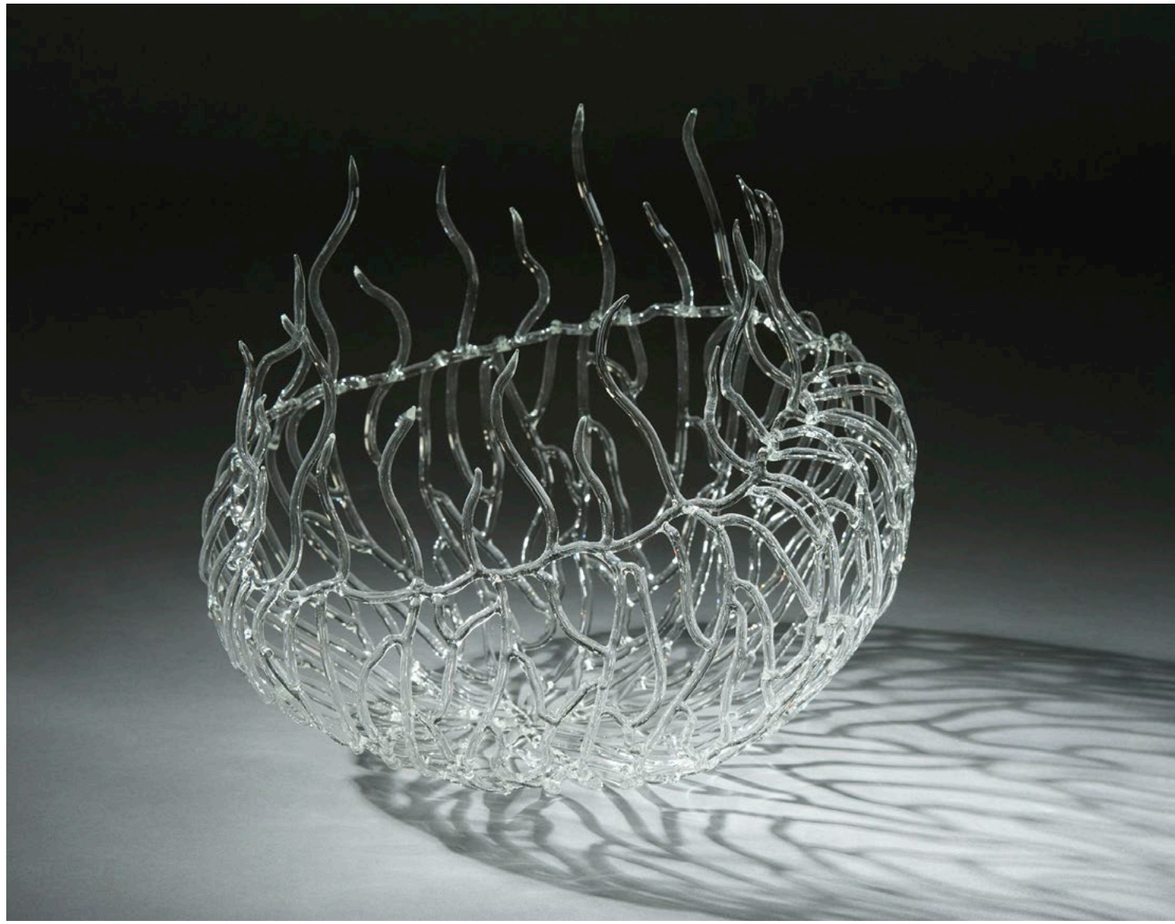
One of the first pieces I made was *Coral Skeleton*. This sculpture was inspired by the intricate patterns found in fan coral. I am also interfor chemistry lab ware and also in the technology sector for fiber optic cable. Most people just know it as the kitchen glass!

I use a small hand-held glass torch to construct free form sculpture. So yes, I think that it is definitely considered a special glass technique in the glass world. Most flameworkers use a large, single bench torch. I, on the other hand, use a very un-macho mini-torch.

My glass is shipped to me in 25 lb cases of four-foot glass rods. I have many cases of glass rods in my studio covering diameters from 3mm to 12mm.

The first thing I determine is the size of the sculpture and the size diameter rods that will best express the life form. Right now I am very interested in several coral species.

I usually begin a piece months and sometimes years in advance. I begin by collecting dozens of macro photographs and historical scientific illustrations about a particular



Jellyfish, by Emily Williams, 2013. Flameworked borosilicate glass, 15 x 14 x 14 inches

Sea Tangle, by Emily Williams, 2014. Flameworked borosilicate glass rods, 13 x 18 x 18 inches

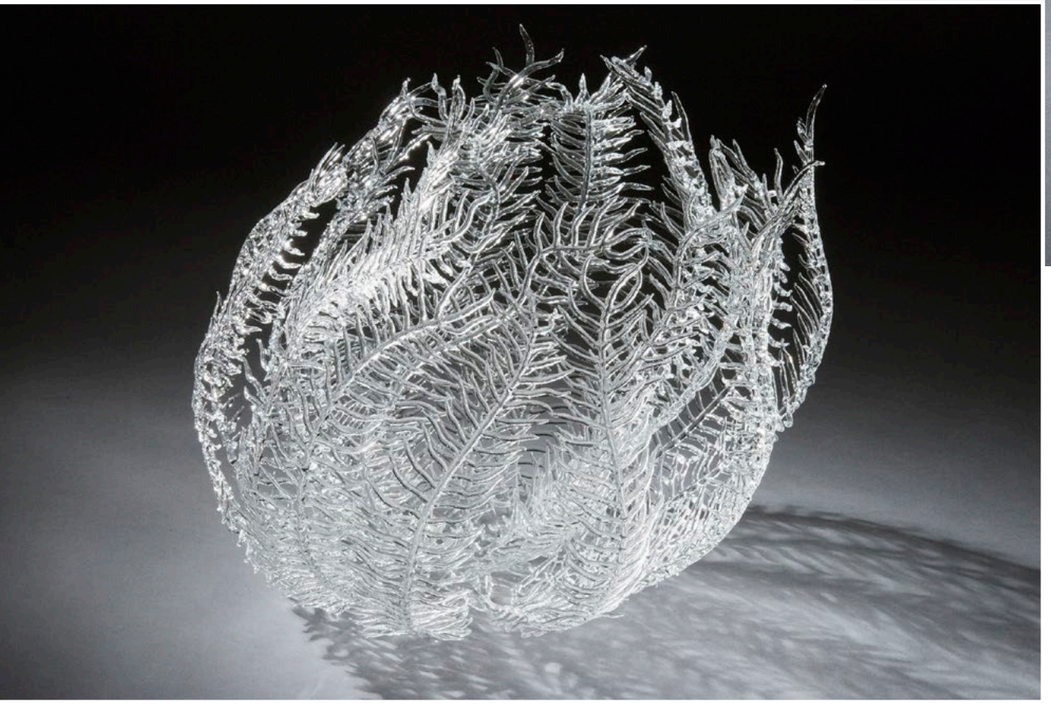
creature. Ideally I would prefer to view the species in real life. Often I begin by trolling through the images until one strikes a chord. It can be a combination of things that draws me to a particular creature. I might be fascinated with the movement, textures and the color patterns.

An image or series of images can help me visualize a sculpture. I then create enlargements of macro images and illustrations. These will be mounted on the wall near my glass bench.

Before beginning a large work, I always create test studies in glass. This way I can test out my ideas about how to build a particular form in glass. I then run the small test sculpture [scale model] through the glass kiln annealing process. In all of the sculptures I create, I anneal the glass periodically to remove the stresses that build up.

Just like a drawing on paper, I begin with the prominent contours and structures of a form. For example, in the *Glass Seaweed* sculpture, I built the entire length of frond stems from the base upwards. Then I added temporary glass supports around the top edge to hold everything in place. Using supports keeps everything stable while working.

I then began at the joints [at the very base of the sculpture], adding all the seaweed tendrils, one by one. I gradually moved around the form in an upward spiral motion. This can take many weeks to complete. The luminous splendor of the *Glass Seaweed* sculpture comes from this intense focus and dedication of time.



Alternate view of *Glass Seaweed* by Emily Williams

I only work on one piece at a time, but while I work, I am already building new sculptures in my mind. For months I have been installing new glass torches and stockpiling transparent colored glass for new coral sculptures.

X-RAY MAG: What is your relationship to the underwater world and coral reefs? Are you a scuba diver or snorkeler and how has this influenced your art?

EW: I have always loved being in and around the water. Most of my experiences with the underwater world were on the Chesapeake Bay with jellyfish and crabs. When I was a child, we moved to southern California. My favorite experiences were on the Pacific Ocean. I loved exploring coastal caves, tidal pools, capturing sea potatoes [a type of sea urchin] or swimming in a kelp forest. Some of the areas around Catalina Island are just amazing.

I have never learned to scuba dive but have done some snorkeling in the Florida Keys. This past year I thought I would like to take some scuba classes so I could visit and learn first hand about Gray's Reef on the state of Georgia's coast.

X-RAY MAG: What are your thoughts on conservation of sea and freshwater environments and how does your artwork relate to these issues?

EW: I think anything that gets people to think about our oceans and waterways is a great thing. Art has a way of breaking through to a lot of people. It's a nonverbal way of expressing really important ideas.

Of course interpretation is personalized but I think glass is a pretty powerful metaphor for expressing the fragile nature of our natural world.

Emily Williams

Handle it with care… I try to be positive in my outlook but there is plenty to worry about in regard to our planet, global warming and the potential harm to so many creatures that live in our waters.

There are many things that communities and industry can do to help conserve ocean habitat such as coral reefs. I was just reading an article by Coral Morphologic about how rare elkhorn coral is being dredged around Miami. I find this amazing that the government is actually dredging out rare coral reefs around a major city in a hurricane zone. The sediment is very damaging to the entire area. So yes, I really care about all the creatures in the ocean from the whales to the sharks to the plankton.

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

EW: I want people to walk away with a sense of wonder and marvel at the beauty of our ocean world. There is a bit of satire in my work, too. It is a serious, caring type of satire. While Leopold and Rudolf Blaschka documented so many species in their 19th century glass invertebrate models, let's not let my work be the cataloging of their demise. It has only been about 100 years since the Blaschka's set out to make their glass models.

We may see a significant decline and extinction of many coral reefs in the next 25 years. I think most people are just completely unaware. Bringing awareness is the start. I would love to be involved with a project that used my glass art to bring more awareness to reef conservation. Not because it's a good, valuable resource to local economies but because it's the right thing to do.

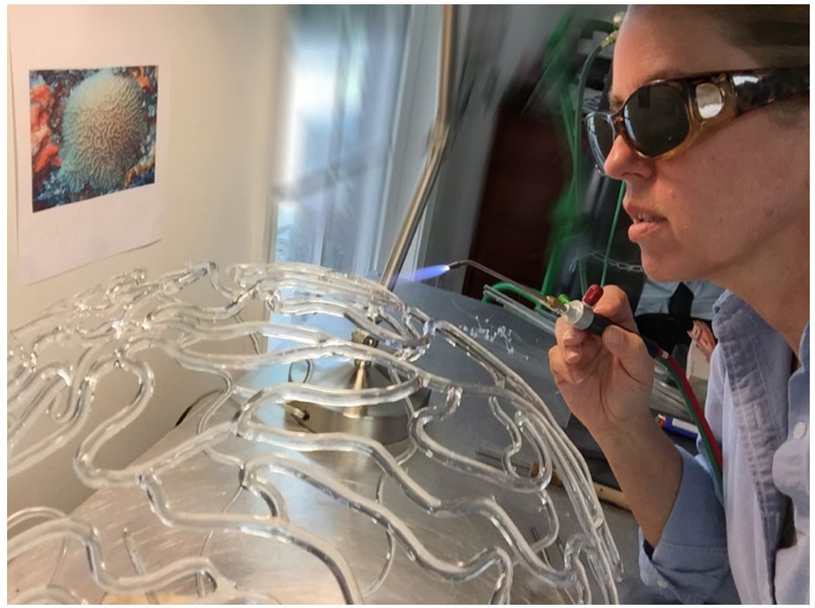
Cornell University has a very impressive collection of marine invertebrate glass models seen here at http://blaschkagallery.mannlib.cornell.edu/ [*ed.— See X-RAY MAG issue #30 for our article on Blashka glass here:* ***www.xray-mag.com/pdfs/articles/Portfolio_Blaschka_30.pdf***]

X-RAY MAG: What are the challenges and/or benefits of being an artist in the world today?

EW: One challenge is that you have to be an expert at so many things. I do all my own marketing, social media, web design, video, and run my studio. Recently my work was featured on a couple of major art blogs and this has generated a lot of interest in my glass sculpture. In the past getting exposure was a lot more difficult for artists. Today you can have exposure around the world in just seconds through Twitter or Facebook. You have to strike a balance. For me, doing my studio work is the most important thing.

X-RAY MAG: How do people respond to your works? What feedback or insights have you gained from the process of showing your work to various audiences?

EW: I have only shown my glass sculptures to the public a few times in the last three years. The response has been very exciting. I would love to put together smaller focused exhibits of my sculpture in an art museum, science museum or public aquarium setting. I think people of all ages are fascinated with these sculptures. I think humans have always been a bit seduced by glass.



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

EW: Lately I have been doing a lot of interviews and responding to requests about my glass sculpture. I have been setting up a new subdomain on my website at **www.emilywilliamssculpture.com** to feature just glass sculpture video demonstrations. These show me working on different glass sculptures. I am very excited about this new video subdomain and will continue to upload new videos.

Expect a lot of brilliant, luminous color in my future work. After the current sculpture is done, I will be creating a series of colored coral sculptures and other types of ocean life. I have been setting up special new torches and testing a palette of borosilicate glass colors. For now I am intensely focused on reef life forms such as corals, sea anemones and feather stars. I would like to get back into doing some colorful jellyfish and maybe even an octopus.

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

EW: If you are really excited about my work and you want to interact with me, I am on a lot of different social media. All of my social media profile links are found on my website in the footer of every page. I have been spending a lot of time on developing my Facebook page and sharing exciting recent interviews, historical scientific illustrations, and glass video. ■

Visit the artist's website at ***www.emilywilliamssculpture.com*** *or see videos of her working on glass at:* ***video.emilywilliamssculpture.com****.*

THIS PAGE: The artist, Emily Williams, working on the glass sculpture, *Brain Coral*