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POINT & CLICK ON BOLD LINKS



# Equipment



Edited by Rosemary 'Roz' E. Lunn

## Halo 3D ♀

Time to rejoice if you are a fan of fourth element, and a passionate temperate water female diver. Fourth Element has just launched the ladies version of the Halo3D. This one-piece biomapped thermal protection garment has been made with functionality in mind—no more having to strip off in a cramped head to relieve yourself. The female Halo3D has an inverse "U" zip at the back, starting at the mid-thigh that runs above the buttocks, and down to the other mid thigh. Apparently, the diver also benefits from warmer hands because of the three layer enhanced thermal protection system located on the inside of the forearms. This helps minimise the cooling of the blood before it reaches the hands.

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



## LX Wing

Hollis continues to expand their equipment range with the launch of the LX Wing. This product has taken three years of research and development, and comes with a lifetime warranty. Available in both single tank and double wing versions, the LX Wing has a 360° internal retraction system to ensure a more streamlined configuration. (The diver may remove the retraction system if they wish). The low-pressure inflator elbow is centrally located to avoid tank valve or regulator interference, and the corrugated inflation hose is oval. Hollis states they have used enhanced materials for the external bladder (1680D Cordura) and internal bladder (420DPU Nylon). [Hollisgear.com](http://Hollisgear.com)



## 50 limited edition

To mark it's 50th anniversary, Scubapro is launching an exclusive limited edition 'gold' version of their best selling, top performing regulator combination—the Mk25 S600. It does look rather striking. The Mk25 is a balanced piston first stage (5LP ports, 2HP ports), whilst the S600 is a balanced second stage with VIVA. (Diver-adjustable Venturi-Initiated Vacuum Assist and diver adjustable inhalation effort.) If gold is not your thing, this popular combination is also available in 'black-tech', 'chromed-brass' and titanium. [Scubapro.com](http://Scubapro.com)



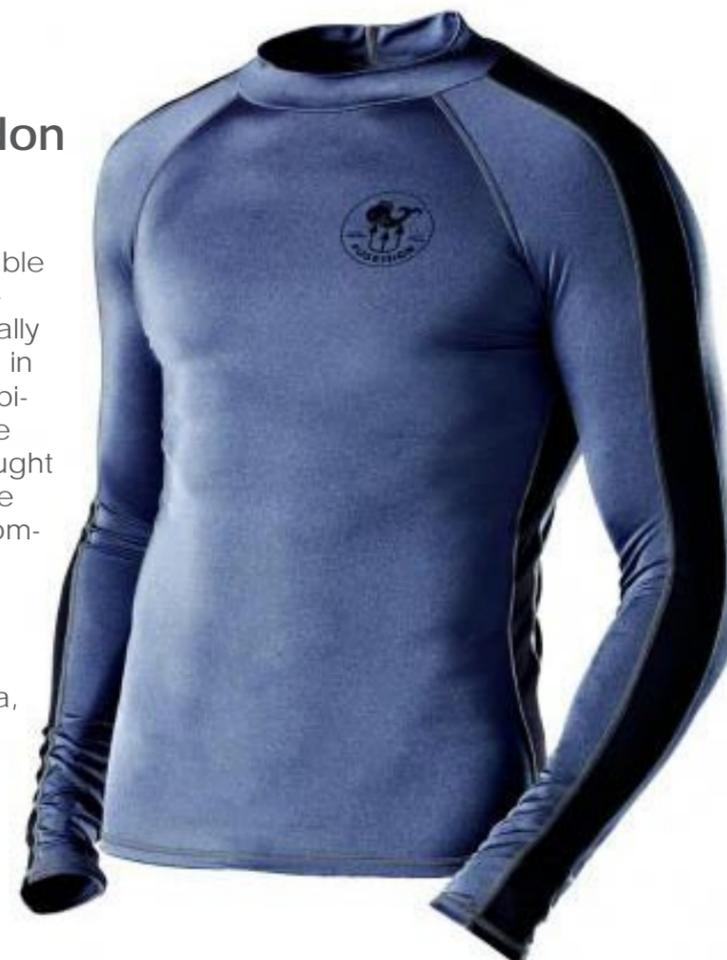
## FAS-t

We spotted this on the Dive Gear Express stand at the 2013 Beneath the Sea dive show. 'The FAS-t' from White Arrow. This device aids a diver to quickly measure existing deployed cave line at a rapid pace. It can be operated with one hand and will be a useful tool for cave explorers, cave scientists and surveying enthusiasts. The nice thing about the FAS-t is that it does not require pre-knotted line or measuring tapes to be attached to the line. The four-digit resettable counter is bi-lingual (feet or metres), and can even measure in centimetres for archaeological purposes. The FAS-t has also been designed to accommodate a variety of line thicknesses, and includes attachments for a compass and survey pad. [Whitearrow.eu](http://Whitearrow.eu)



## Poseidon top

Everyone needs reliable sun protection, especially when playing in and around tropical waters. Active wear garments ought to be flexible, durable and give lasting comfort, and it looks as though Poseidon's shirt ticks all these boxes. Constructed from high quality lycra, Poseidon's offering comes in two colours—luscious red and muted grey. Comes with the signature ONE stripe down the arm. [Poseidon.com](http://Poseidon.com)



# Peter Hughes

## *The Comeback Kid*

Edited by Peter Symes. Head shot by Peter Symes. Company photos courtesy of Peter Hughes

**Dive pioneer Peter Hughes sat down with X-RAY MAG to give insight into his 40-plus years in the dive industry, what has inspired him and his thoughts on the future.**

*X-RAY MAG: Why? What is so cool about diving?*

PH: The general silence, bubbles only, the weightlessness allowing three dimensional freedom of movement, the colours, the behaviours of the life we see... So many things...

*X-RAY MAG: What does it do for you?*

PH: Major stress buster! Allows one to clear one's mind of just about everything except the "here and now" of the experience at the time.

*X-RAY MAG: You have spent 40 years in the dive industry. What have been the highlights?*

PH: My greatest "high" or achievement after so many years might be receiving the 2011 DEMA Reaching

Out Award and being entered into the Diving Hall of Fame.

*X-RAY MAG: And lows? What are the most significant lessons you have been able to draw from your long career?*

PH: There have been many highs and, indeed, many lows over those years. One lesson that I think I learned early on is to always face your "lows" (and highs) with honesty and integrity, and in the end, you will persevere.

*X-RAY MAG: Is there any particular wisdom or advice you would like to pass onto start-ups in the dive industry?*

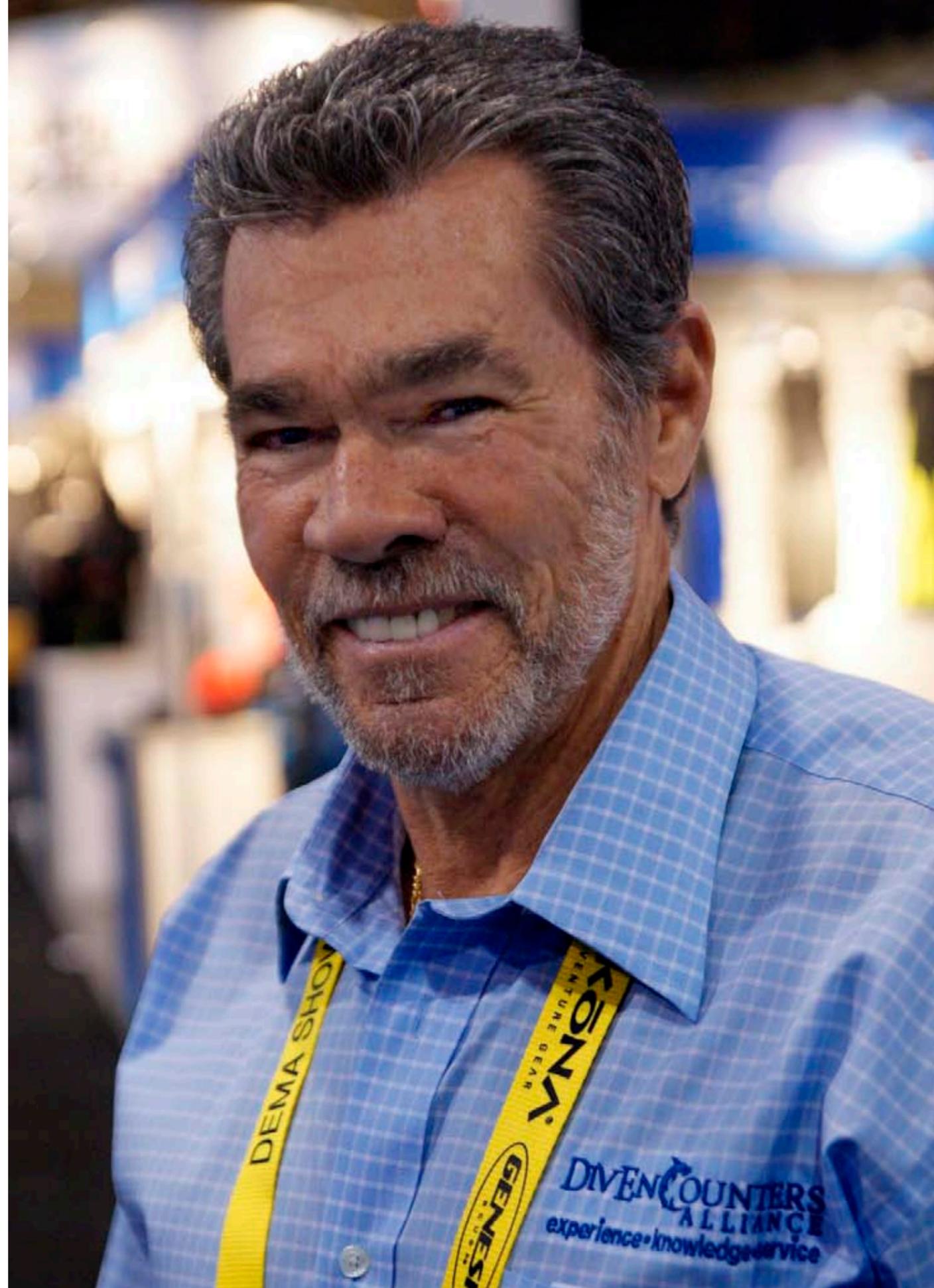
PH: Remember, it is a business—not a hobby! Good business practices must prevail if you want and expect success. In my side of the business, the customer is *priority number one*—treat them at all times as you'd want to be treated when you are on vacation. Remember always that your job is their vacation. They have entrusted you with their hard earned dollars and their equally valuable time. You have a responsibility, having accepted both to deliver what is expected. Again, honesty and business integrity must always take precedence over ducking the truth, or

your responsibility to your customer. Think of them as invited guests in your home.

*X-RAY MAG: You mentioned to me, that watching Jacques-Yves Cousteau at a young age had a great influence in setting you off on a career in recreational diving, and you are not alone. I have spoken to many other dive industry veterans who say the same thing, and his TV shows were an early inspiration for me, too. It seems to me that he probably did more for making diving a popular past-time than any other person, living or deceased. But most people under 40 only seem to have distant notion of him.*

PH: So true. As I clearly seem to remember it, my father who never dived, saw my immediate love of the ocean as soon as we boarded that 11,000 GT oil tanker in Sept 1951 on our family voyage of immigration from the United Kingdom (Scotland) to Trinidad and Tobago and did everything to encourage it—teaching me to swim aboard the ship in their above deck, canvas, salt water pool.

It was within only a few years, as I became an accomplished swimmer, that he bought my first pair of goggles (no mask), a nose clip (which looked like a clothespin with pads), and a snorkel (a long aluminium



S-shaped tube with a simple mouthpiece on one end and a rubber cage with a ping-pong ball in it to prevent ingestion of water. On the other hand for my tenth birthday, he bought me Jacques Cousteau's, *Silent World*, and I was hooked for life!

X-RAY MAG: What is your take on his influence on the steady growth of diving in the late 20th century and the subsequent on-going contraction of the dive industry we have seen since the turn of the millennium? Considering that the downward trends in our industry began many years before the onset of the current financial crisis and also went on during the early years in this century where the general economic climate was quite positive. How much do you think we can attribute to the 'Cousteau-effect' fizzling out? Are role models and public figureheads really all that important? Or should we predominantly look into more mundane explanations such as bad management, or the sport just falling out of fashion?

PH: I think the Cousteau-effect and the Mike Nelson television series *Sea Hunt*-effect, for example, brought diving and adventure into the minds and homes of millions. We have nothing like that any more. Diving has maybe lost the glamour of adventure and is seen as something too mundane for adrenaline junkies.

Today, we have many more activities and sports competing for the attention of our young people. Our dive demographic is aging—never a good thing! I may be a perfect example, along with some of my closest friends and colleagues—65 years old and still playing the game.

Maybe there should be—like in the animal kingdom—some young buck vying for my position, fighting to throw me out into retirement, so he or she can take my place. Just a thought...

*Back at the beginning when Cousteau gave us the regulator—I still have my Calypso camera from the mid-60's—things were simple, different, new, exciting. I learned to dive with a double hose regulator. I still have two perfectly good ones...*

Back at the beginning when Cousteau gave us the regulator—I still have my Calypso camera from the mid-60's—things were simple, different, new, exciting. I learned to dive with a double hose regulator. I still have two perfectly good ones, a harness—I had to learn how to use a safety hitch for quick release in case of an emergency—a J-valve (which mechanically gave you 300 psi

after it became hard to breath—plenty of time to ascend safely), and a weight belt (always worn over the crotch strap of the harness so it could be dumped in an emergency).

Today, diving has perhaps and unfortunately become a bit mundane, as you put it. Nothing terribly exciting and nothing really new—except for, of course, the dive computers, and thank God for them—has come on line. We are just trying to build a better mouse trap.

Those into rebreathers and technical diving will disagree with me—and I can agree with them—but rebreathers and technical diving is not for the majority. Diving has become an increasingly expensive sport-hobby-activity.

So perhaps, with this said, much of the excitement has gone, in this respect. But, the

good news is that the underwater experience is now easier than ever. Diving can be a family activity like few others. Four generations can dive together, all together, on an even playing field in many world-class dive destinations, and the better mouse traps that the manufacturers are coming out with make diving so very much safer for all to enjoy.

X-RAY MAG: What was your first dive like?

PH: WOW! That was in 1957—some 55 years ago—off the beach in Tobago at a place called Batteaux Bay. I was taught by one of the YMCA's earliest instructors, a man called Bill Petry. We still keep in touch today. Bill is about 85-years old living in La Grange, Georgia.

The only time I have ever remembered feeling quite as excited was maybe when I made my first solo flight in 1981. I am sure I was terrified on that solo flight, but there was absolutely no fear on that first dive and after it. At ten years old, I knew I wanted to be a diver when I grew up. I started a career in diving, and at 17 years old,

*...the good news is that the underwater experience is now easier than ever. Diving can be a family activity like few others. Four generations can dive together, all together, on an even playing field in many world-class dive destinations...*

## The Pro behind Techni-Pro.

## Peter Hughes discovers the first and only fog free mask.



that had bought the British oil company Regent Oil that my parents immigrated to Trinidad to work for—and I entered the oil industry as an apprentice oil field production engineer.

This lasted until I was 21 years old, when the call of the ocean was too great. I quit and returned to Tobago to work for the man that had taught me to dive, and my career in recreational diving was off and running—been at it ever since!

X-RAY MAG: What is the best memory or experience diving has been giving you?

PH: This is difficult to answer. I have had many, many exceptional experiences. Along the way, I have lost hundreds of thousands of dollars and gone broke a couple of times. I have made excellent money from time to time, too. I lacked any type of advanced education but learned

along the way from my better educated colleagues and even served as Vice President, an officer of a public company for five years. I learned so much while there about business, but I also learned corporate America was not for me.

X-RAY MAG: Are there any new places you would like to see?

PH: Due to my choice of career, I have been more fortunate than most. I have

I was an apprentice diver on the dock in Port of Spain, Trinidad, working for South American Marine Operators and Salvage, Ltd., making TT \$50.00 a week—about US\$25.00 a week at the exchange rate at that time. I loved it, but the job did not last. One year before hard times hit the company, I was laid off at only 18 years old.

My father now insisted I get a real job and used his influence with Texaco Trinidad, Inc—the American oil company

dived in so many exceptional places, but I am always ready for a new dive experience—as long as the water is clear and warm-ish! This becomes ever more important the older I get, and I'm not sure I'll ever get excited about cold water diving.

*X-RAY MAG: What were the differences in creating your former liveaboard company, Peter Hughes Diving/ Dancer Fleet, and setting up DivEncounters, and how did your past experiences aid you in setting up your new venture?*

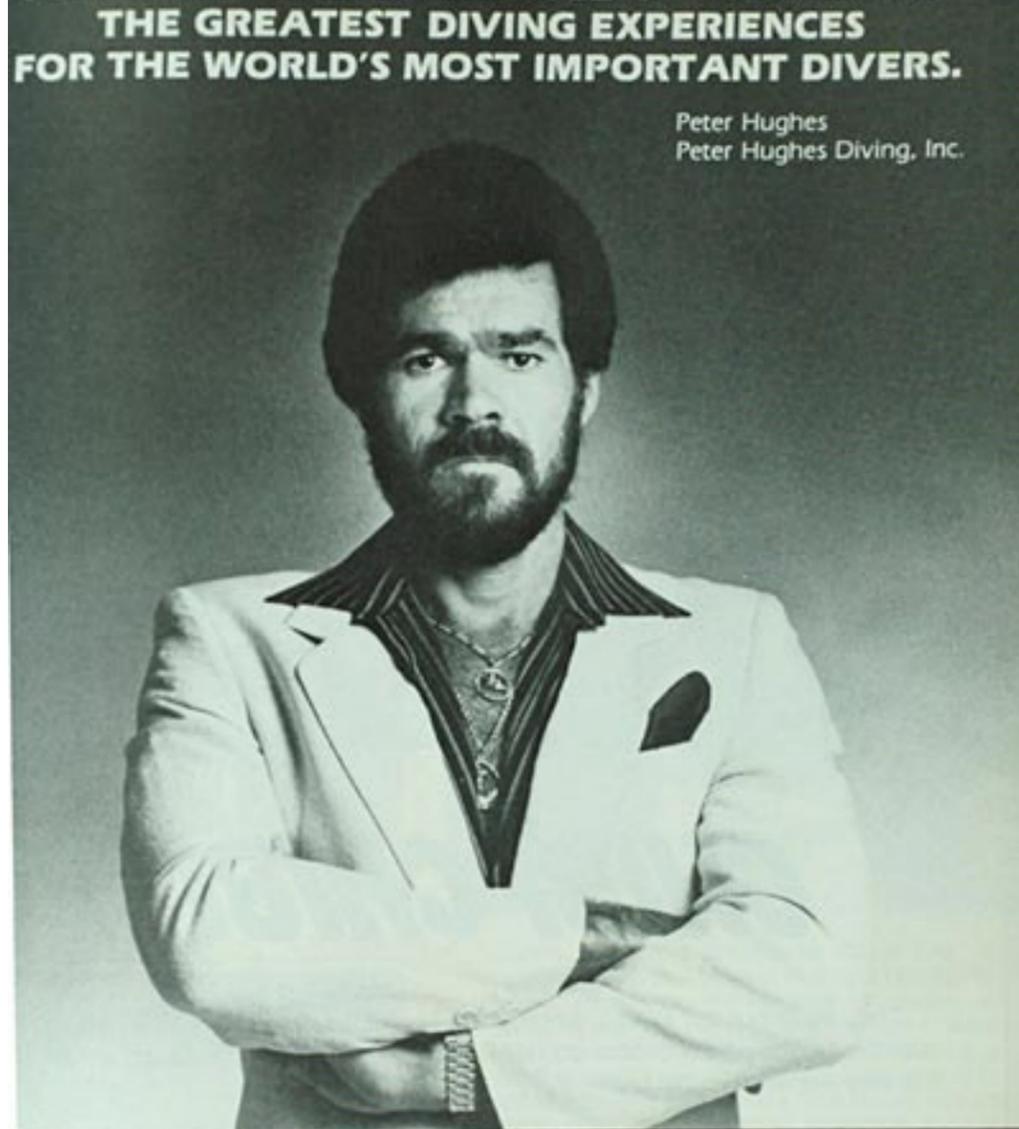
PH: Peter Hughes Diving was the U.S.-based marketing, sales, reservations and management company for the entire Dancer Fleet. At its prime, there were eight vessels in the Dancer Fleet, and all were controlled by Peter Hughes Diving. Five of the eight were owned directly by my wife, myself and the bank, and three were operated under a marketing/management agreement.

This business model allowed for Peter Hughes Diving to make all but the most basic sales and operational decisions for all vessels in the fleet. We set what I call cookie cutter standards that all vessels had to comply with—sometimes a good thing but more often a bad thing, as no two vessels or destinations are ever the same environmentally, geographically, politically or socially, and that could and did lead to problems.

It also had certain on-board advantages,

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and the Fleet prospect developed a certain trust along with expectations from our guests. It was a full time and never easy task to maintain those standards and meet those expectations, and I think we did a darned good job. But after so many years at the helm, and seeing the different economic conditions developing, I felt I could do things differently and better. So, I sold my company in 2008, remained employed as president for two years to assist the new owner wrap his arms around it, and

resigned in 2010.

Knowing the Fleet mentality, knowing the Fleet operations strengths and weaknesses, I was confident I could build a better mouse trap. With this conviction, I set about approaching who I had come to recognize as the "Best Live-aboards in the Best Destinations" around the world with my plan and idea for the DivEncounters Alliance, taking full advantage of the upsides to a fleet approach but dumping the many downsides, encouraging independent owners and operators—all experts in their respective areas—to come together, offering an Alliance of experience and expertise, with all the guest advantages of fleet operations but none of the disadvantages.

With the Alliance, the partners benefit from each other's extensive experience, as do our guests. Our guests also benefit by way of our Alliance Awards program. Through the Alliance, guests can travel with a great sense of confidence when choosing an Alliance vessel for their live-aboard vacation.

*X-RAY MAG: What kind of commonality do the DivEncounters partners share, or what criteria must potential new partners meet to join the alliance?*

PH: All partners have been deemed to be the most, or at least among the most, experienced in their respective area. All must have an unquestionable business reputation. All must have all operating per-

mits, licenses, etc, firmly in place. All must adhere to recognized safety standards, as determined by the IMO (International Maritime Organization). All must own and operate a vessel of modern standard and capability. All must recognize the value of their partners to them and of them to their partners, and so never see any as a competitor but as an ally. This allows for some incredible cross-marketing opportunities and builds a sense of confidence in the Alliance within the consumer side of our industry.

*X-RAY MAG: I understand that you were a primary consultant in the design of M/V Galapagos Sky. Which particular considerations go into the layout of a live-aboard vessel?*

PH: Correct. The M/V Galapagos Sky was launched in 2000-2001 as the M/V Sky Dancer, operating with me in the Dancer Fleet under our standard marketing/management agreement until 2010, when the owner decided to trigger his escape clause in the Dancer Fleet agreement and join us as founding member of the DivEncounters Alliance.

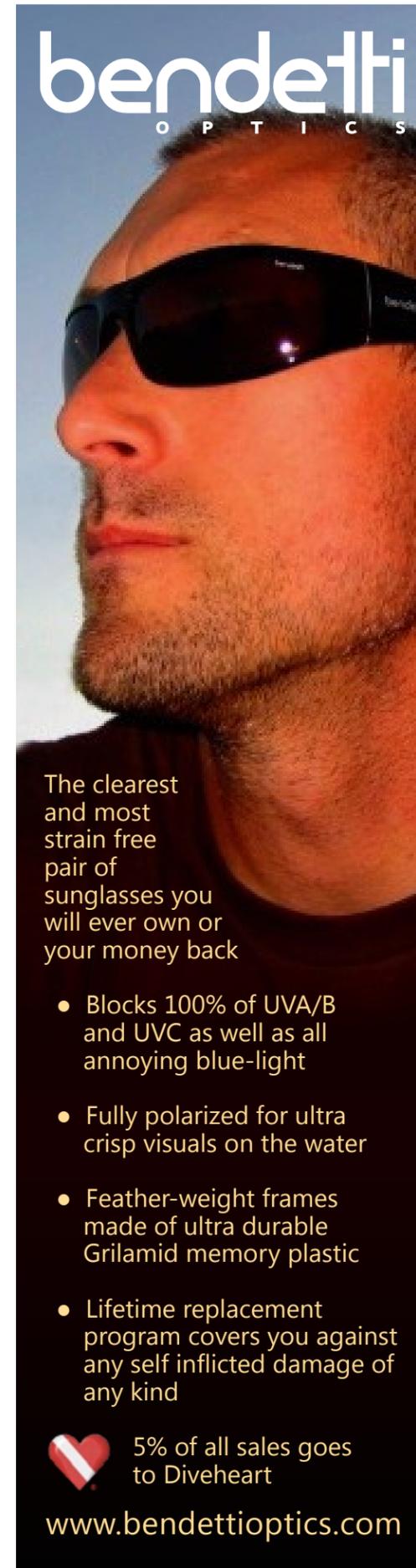
It was in late 1998-early 1999 (approximately) that the owner approached me in my Miami office with his plans to expand his Galapagos operation from three beautiful and very successful 20 pax live-aboard eco-yachts with a live-board dive yacht.

We worked on the blue prints together with his naval architect over several weeks, changing the excellent but basic eco-yacht into a luxury, purpose-built live-aboard dive vessel. There were many criteria that we looked for, but first and foremost was guest comfort and convenience while never compromising on safety for either.

The words, "guest comfort and convenience", cover just about everything, as the details include everything from dive deck layout, to galley layout, to cabin format,

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to en-suite facilities, to safety equipment, to engines, generators, compressors, water makers, etc., etc. A good liveaboard dive vessel is a working, self contained boat, giving the guests on board a yacht-like living experience between their dives.

**X-RAY MAG:** *In which ways are today's clientele different from the early customers? Are their expectations and needs different? Do they now come already equipped with a better or different environmental understanding and awareness?*

**PH:** There are two answers to each of your three questions: yes and no. For the most part, today's clients, or guests, are very different from those from the earlier days. But refreshingly, sometimes there are those that are almost exactly the same. But these are in the minority.

Today, many more women travel on liveaboard dive vessels than in the early days, and I think my wife is greatly responsible for this. In 1991, with only the *M/V Sea Dancer* in our fleet, I told her I intended to build or convert a second liveaboard. After telling me that I was "nuts", she further informed me that if I was indeed intent on such a silly idea, I "better damn well build a boat she could live on when we went broke". And she immediately got involved in integrating the "comforts of home" into our second vessel!

These comforts of home have since become the benchmark for the industry. With this upgrade to the industry benchmark some 20 years ago, guests today have

much higher expectations of what their living quarters will offer while on board, including their culinary expectations (there are some amazing dietary request sometimes, with guests forgetting that many liveaboards operate in truly third world countries), ease of and access to the diving, etc.

Environmentally, thankfully, many are much better informed and therefore caring. But unfortunately, we still see too many poorly trained divers with little or no buoyancy control, doing damage to the environment. Others are too intent on their own pursuits to care. But again, thankfully, these are the minority. Divers are the world's eyes to our deteriorating ocean conditions and are our best ambassadors for change.

**X-RAY MAG:** *I have often heard that people may i.e. put off getting their kitchen renovated for another year, or not get a newer car model, rather than give up their vacations, or trips,*

*Today, many more women travel on liveaboard dive vessels than in the early days, and I think my wife is greatly responsible for this. In 1991, with only the M/V Sea Dancer in our fleet, I told her I intended to build or convert a second liveaboard. After telling me that I was "nuts", she further informed me that if I was indeed intent on such a silly idea, I "better damn well build a boat she could live on when we went broke". And she immediately got involved in integrating the "comforts of home" into our second vessel! These comforts of home have since become the benchmark for the industry.*

*or down-size a bit and go for a cheaper offer. Do you recognise this picture, and going forward, how do you respond to the challenges of the current economic climate?*

**PH:** We certainly see the trend referred to and realize the discounted trips present a challenge. We respond by our educational efforts: price vs value—know the difference.

Yes, in the short term, deep discounts as we see flooding the market these days look good to the consumer, especially those with a limited vacation budget. But the reality is, we know what it costs to operate a world-class liveaboard dive vessel. And while (as aforementioned) no two destinations are ever the same costs are higher today, everywhere, than they have ever been, none of us get into business for "charitable purposes" only, and so have the

right to make a reasonable return on the considerable investment represented by the costs involved in owning any decent liveaboard dive vessel.

If a reasonable price and therefore return on investment cannot be realized, then something must give. I have always said the same about the airline industry. I'd rather pay a reasonable fare amount than see aircraft maintenance or personnel training suffer when I'm going up 35,000 feet in the air. So, the public needs to always keep that in mind when pressuring for discounted, cheap trips.

**X-RAY MAG:** *Outside of the dive industry, who are your role models*

*Divers are the world's eyes to our deteriorating ocean conditions and are our best ambassadors for change.*

*and where do you seek inspiration?*

**PH:** I have been so deeply focused and involved in the dive industry and for so long, I unfortunately

cannot point to any individual I can say gives me inspiration. I do, however, look to huge companies, handling thousands of customers for inspiration and direction—companies such as Disney World, Royal Caribbean Cruise Lines, any major airline—comparing our U.S. airline operations to some of the overseas (Asian in particular) airline operations, etc. There is so much to be learned from these companies, and some really do inspire you to the next level. ■



The *Galapagos Sky*

# *Diving with Seals* Farne Islands

*United Kingdom*

Text and photos  
by Lawson Wood

The Farne Islands are a small group of some 33 rocks and islets (depending on the state of the tide which has a rise and fall of over 6m or 20ft) located off the north Northumberland coast of England. At full tide, only 23 larger rocks and islands are visible, but all of those are eye catching. The entire group are a National Trust protected area and have numerous wildlife preserves, notably for their seabirds and seals.

There are over 50 historic shipwrecks found directly around these islands, however, it is for the encounters with grey seals that divers and underwater photographers keep returning to this picturesque group of islands just 3km offshore.

There are numerous sightseeing boats and dive boats that run regular trips to the islands, but Paul Walker of Farne Discovery ([www.farneisland-divers.co.uk](http://www.farneisland-divers.co.uk)) I personally feel, has the most experience and empathy for the seals and the most knowledge about the hidden shoals, wrecks, reefs and currents, which can play havoc for inexperienced divers and boat skippers.

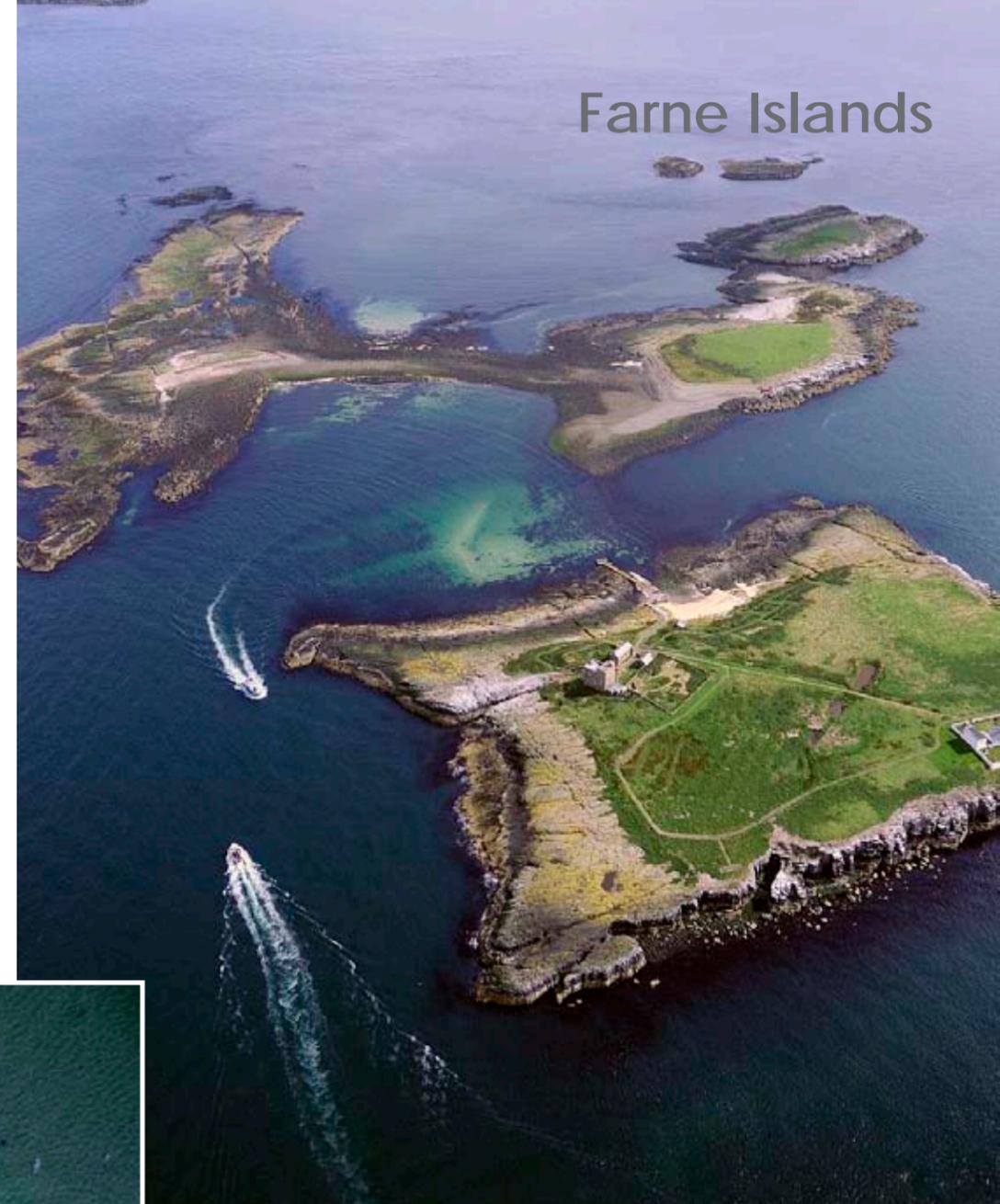
Playful grey seals in the waters off the Farne Islands, Northumberland, England





Grey seals (left) resting on rocks, Holy Island; Aerial view (right) of the Farne islands

Lindisfarne. St.Cuthbert followed in his Holy footsteps and settled on the islands in 676AD where he built a 'cell' for himself, a well for fresh water and rooms or 'hospitium' for other visiting monks. In ancient legend, St.Cuthbert drove out all the evil demons and spirits from the inner islands, yet their strange wails and screams could still be heard on the farthest rocks and were thought to be the spirits of drowned sailors; now it is more generally accepted as the sounds from the huge colony of grey seals. St.Cuthbert was also the first person to officially protect wild birds and



## Farne Islands

Geologically, the islands are part of what is known as The Great Whin Sill, a 30m (100ft) thick seam of diamond hard dolomite that was formed in recent geological time. Its aspect is of columnar shape cut with numerous fissures, the most obvious being 'The Stack' off the southern edge of Farne Island, which is over 20m (66ft) high. Staple Island has three huge individual stacks called The Pinnacles. Most of the larger islands are now topped with peat and are very fertile with the droppings of the seabirds mixed with seaweeds. Built in 1811 and 1826, there are two lighthouses on the islands—one on Farne Island and the other out on the Longstone. Now fully automated, the very early lighthouses first burned their rudimentary light to warn sailors of the treacherous reefs and shoals

back in the 16th century. Most people know of the Farne Islands from the outstanding heroism of Grace Darling and her father William Darling, one of the lighthouse keepers of the Longstone Lighthouse. On 7 September 1838, Grace Darling and her father rowed out to the shipwrecked *Forfarshire* and managed to rescue nine seamen in absolutely atrocious sea conditions. This act of selfless heroism attracted massive media attention and made Grace Darling a national heroine. The Farne Islands were first inhabited by St.Aiden in 635AD, before he became the Bishop of



Massive colony of grey seals on beach, Holy Island

laid down the rules for the safety of the eider duck population, which was so vital for the collection of eiderdown, still known worldwide for its thermal properties. Seals, or 'celys' as they were first known, were actively hunted by the monks as a high protein food source as well as providing oil for their lamps. Seals also provided the monks with a very profitable income—that and the salvage of

shipwrecks of course! The monks also farmed, raised cattle, fished, collected seabirds' eggs, and peat for their fires and kept one island reserved for the burial of lost sailors who had drowned and washed up on the islands' shores. The name *Farne* is a derivative of the ancient Celtic name *Ferann*, which roughly translates as *land*. I imagine that this group of large rocks was the first point of contact that raiders or settlers from Europe first saw of this beautiful low lying coastline. Individual names to the rocks date back to the sixth and seventh cen-



There are massive colonies of sea birds such as puffins (left) on some of the islands; Farne Islands from above (right); Location of Farne Islands on map of British Isles and global map (below)



most cod species, salmon and sea trout, flatfish, herring and sandeels. Being opportunistic

feeders, when fish are in short supply, they will eat almost anything, including crab and lobster, octopus and squid. There are huge aggregations of sandeels to be found around the Farne Islands in the spring months, and this massive natural resource is also very important to the colonies of puffins and other seabirds found on the ancient rookeries on the islands.

or cows are much smaller, typically 1.6 to 2.0m (5.2 to 6.6ft) long and 100 to 190kg (220 to 420lb) in weight. The males have a straight head profile—a classic arched ‘Roman’ nose with large wide-set nostrils—and few spots on the body, which is generally darker than the females. They often have many scars around their necks earned from either protecting their harem or gaining superiority in a group. The females are generally a silver grey colour with light brown patches.

Diving down as deep as 60m (200ft), seals require an estimated 5kg (11lb) of food each day, but the females never feed during the breeding season, until their young pups have weaned. They feed on a wide variety of fish including



Puffin returns with fish from the sea

turies and have remained almost unchanged to this day with names such as Swedman, Wamses, Knavestone, Wedums, Crumstone, Glororum Shad, Brada and Callers, to name but a few of these evocative sites. Some are more known for the massive colonies of terns, eider ducks, gulls and puffins, whilst others have a shifting population of itinerant grey seals.

These seal colonies are entirely dependent on the weather and height of the tide, as they like to bask in the sun on flat rocky outcrops that have direct access to deep water, directly off the shore.

Sheltered locations and snug little bays are also favoured by the seals, and with a resident population of over 4,000 grey seals, there are plenty of opportunities for everyone to experience the thrill of a lifetime.

On nearby Holy Island or Lindisfarne, there are two more massive colonies containing another 5,000 grey seals. Over 1,600 seal pups were born in the 2012 season. While the mortality rate in the first year alone is very high at over 50 percent, the number still puts a tremendous strain on the population’s food source, resulting in large numbers

of seals migrating to other parts of the United Kingdom. Tagged individuals from Scotland have been found as far away as the Norfolk coast of England and the Baltic Sea. One particular individual was recorded as moving from the Moral Firth in northern Scotland to the Farne Islands, back up north to the Faroe Islands on the way to Iceland and southwest again to Ireland before the transmitter’s battery failed!

### The grey seal

Known as *phoque gris* by the French and *foca gris* by the Spanish, the grey seal (*Halich-*

*oerus grypus*, meaning “hooked-nosed sea pig”) is the most common seal found around British coastal waters—in fact, much more common than the common seal (*Phoca vitulina*).

The grey seal is a true seal—the only one classified in the genus *Halichoerus*—and is the largest carnivore recorded in British waters. It is found on both sides of the Atlantic and is also known as the Atlantic gray seal or horse-head seal.

It is one of the largest seals with bulls reaching 2.5 to 3.3m (8.2 to 11ft) long and weighing 170 to 400kg (370 to 880lb). The females



THIS PAGE: Diving with grey seals in the waters of the Farne Islands

## Farne Islands

Islands. Other large colonies on the east coast include the Isle of May in the Forth estuary of Scotland and Donna Nook in Lincolnshire.

The pups are covered in long, soft, silky cream hair, and although they are quite small when first born, they rapidly put on weight, suckling their mothers five to six times each day for the first three weeks. This fat rich milk ensures the rapid growth rate of the pups, and the mother will lose a quarter of her body weight during this period. Within a month, the pups have tripled or quadrupled their weight, have replaced their sleek hair with the dense, waterproof, adult seal skin and are abandoned by their mothers to fend for themselves.

The females soon become fertile after weaning the pups and may mate with a number of different bulls. Pregnancy lasts for 11.5 months, with the fertilised embryo remaining unattached for the first 3.5 months. This delayed implantation is common in a number of aquatic species, resulting in seal pups all being born around the same time each year.

Seals can grow quite old, with records held for males over 35 years and females, less so, at 25 years. As usual, there are always exceptions to every rule, with one old female in the Shetland Islands reaching 46 years of age!

Normally, females give birth to only one pup and are known to abort additional fetuses. However, it was recorded on the Farne Islands in November 2012 that twins were born for the first time known to scientists.

As grey seals are at the top of the food chain in British waters, they are also susceptible to the accumulation of pollutants and heavy metals such as PCB's (polychlorinated biphenyls). Females feeding on polluted fish may fail to breed resulting in hindering the recovery of some populations that have been reduced by disease.



Pups are born from September to November from Canada down as far as the U.S. state of Virginia and from November through February in the western Atlantic. It is widely understood that the rising seal populations in the Cape Cod area of the U.S. state of Massachusetts were the reason that great white sharks started to be seen so frequently.

Protected under the Conservation of Seals Act of 1970, no hunting is allowed of the seals, but the rising numbers are causing increasing alarm to inshore fishermen who are complaining about dwindling fish stocks and are urging governments to take a fresh stance on the numbers and allow for culling to take place. Seals are allowed to be hunted legally in Sweden and Finland.

The largest colonies in the eastern Atlantic are found in North Rhona off the Hebrides in Scotland, and approximately 12 percent of the world's population is found in the Farne



### Diving with the seals

Paul Walker of Farne Discovery has an empathy with the seals and great knowledge of their habits, habitats and movements. He is able to find the best

# Farne Islands

THIS PAGE: Scenes from diving with grey seals of the Farne Islands; Numerous sightseeing boats and dive boats (below) run regular trips to the islands



fins, or even try and pull your dive hood off! As soon as you turn around to confront your attacker, it scoots off or just stays in mid-water acting all innocent.

Turning around to photograph your first subject, you discover that it has disappeared in a cloud of bub-



est hunters in the coastal waters.

### Conservation status

The grey seal is classified as Least Concern (LC) on the IUCN Red List. They are protected in Europe under Annex II and V of the EC Habitats Directive and Appendix III of the Bern Convention. In Britain, the grey seal is protected under the Conservation of Seals Act 1970 (closed season from September 1 until December 31) and listed under Schedule 3 of the Conservation Regulations (1994). In Scotland, it is still legal—within reason—to shoot seals that are damaging fish nets as long as it is outside the closed (breeding) season, although there is provision in the Act to completely protect them. ■

*A founding member of the Marine Conservation Society, Lawson Wood has authored and co-authored over 45 books mainly on the underwater world. He is the founder of the first Marine Reserve at St. Abbs and is the first person to be a Fellow of the Royal Photographic Society and the British Institute of Professional Photographers solely for underwater photography.*

sheltered conditions for great underwater wild animal interactions with these massive sea mammals. Depending on the rising and falling tide as well as current conditions, Walker will lead a small group of divers from his Rib Farne Discovery to the best locations for two dives.

Seals are everywhere. There are often literally hundreds of seals in the water, all of them looking at you on the bright orange boat (have you ever had that feeling of being watched? Well, multiply that a hundredfold). The younger yearlings and sub-adults are the most curious, often coming right up to the side of the boat before

you even get in the water.

However, once in the water and approaching the first seals on the surface, they are quite skittish and will quickly disappear beneath the waves and vanish into the kelp covered canyons. Swimming slowly, it pays just to stay still mid-water or crouch on the seabed and wait for the seals' curiosity to overtake them. They just cannot help themselves and soon come right up to you and seemingly pose for the camera.

As seals can slow their heart-beat down whilst underwater, they can stay submerged for around 15 minutes and often appear to be asleep on the sea-



bed or amidst the shallow kelp. This is just a ruse to ambush you! Whilst you are 'sneaking' up to photograph the resting seal, another seal has circled behind you and may start to tug at your

bles, only to have your attacker have another fun go from behind at your expense. They clearly have enormous fun doing this, and it gets quite infectious, with the divers enjoying the experi-

ence just as much as the seals. These encounters are not to be missed, and the Farne Islands are one of the best and safest locations for in-water wild animal encounters with one of the sleek-





Edited by  
Bonnie McKenna

## Heat could be stifling turtles' swimming abilities in Australia

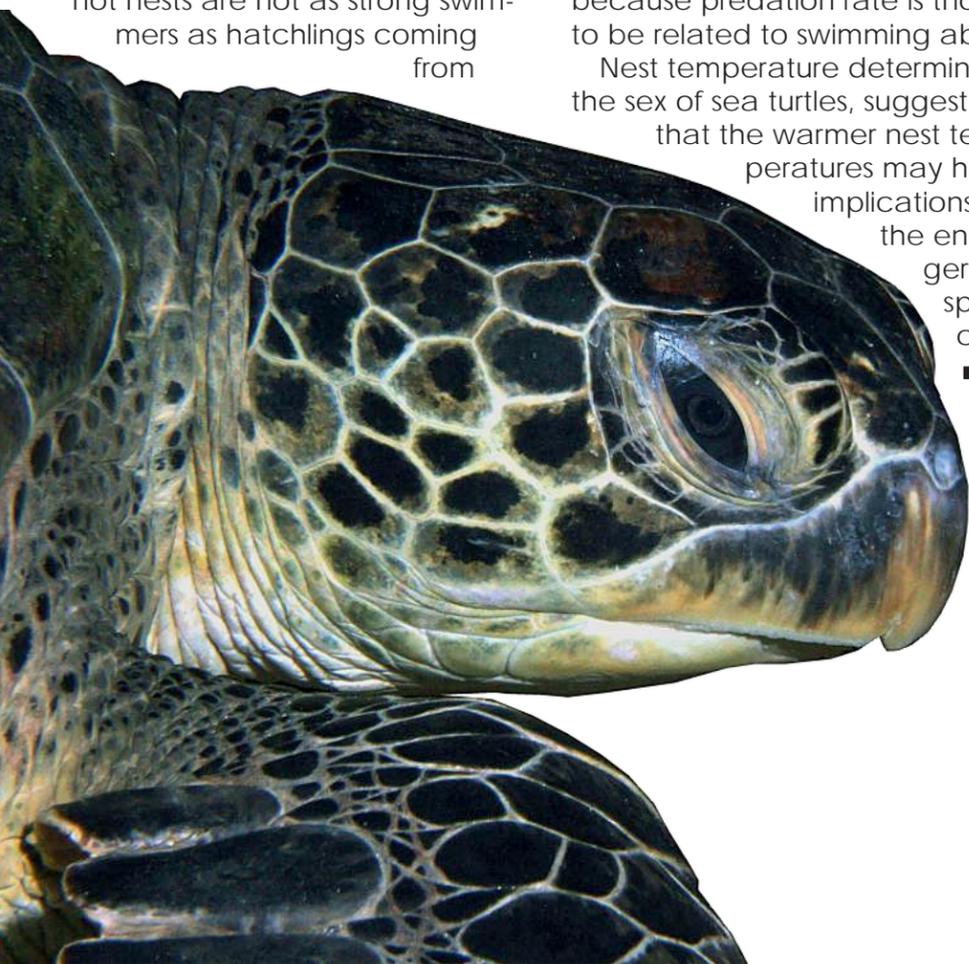
Zoologist Dr David Booth, for the University of Queensland's School of Biological Sciences, said green turtle hatchlings from Heron Island did not seem to be swimming as well as usual.

"Initial impressions are that hatchlings emerging from these hot nests are not as strong swimmers as hatchlings coming from

cooler nests recorded in previous years," said Booth.

Booth noted that if climate change results in consistently high nest temperatures, then the poorer swimming ability of hatchlings may have a negative impact on the number of hatchlings because predation rate is thought to be related to swimming ability.

Nest temperature determines the sex of sea turtles, suggesting that the warmer nest temperatures may have implications for the endangered species. ■



## Leatherback sea turtle will be extinct in 20 years

The western Pacific leatherback turtle a common sight in waters outside the San Francisco Golden Gate could be extinct in 20 years if more is not done to protect its habitat and nesting sites, a team of international experts concluded.

The worldwide population of the Pacific leatherback has declined more than 90 percent since 1980 because of commercial fishing, egg poaching, destruction of nesting sites, degradation of foraging habitat and changing ocean conditions.

Marine biologists believed the global population had stabilized but a new study shows the popu-

lation is in decline.

In 2011 researchers counted 1,532 nests on the Bird's Head in Indonesia as compared to 14,455 in 1984. That averages out to a 5.9 percent drop in nests per year. The study estimates that are now only 500 turtles nesting on the Indonesian population. If this trend continues the species will be extinct in 20 years.

"Our view is that if we don't take dramatic action to eliminate threats to the leatherbacks both in our waters and abroad, we will lose this incredible, iconic animal forever," said Geoff Shester, the California program director for Oceana. ■

## Georgia beaches 'critical' for loggerheads

Twenty-three miles of beach along the East and Gulf Coasts beaches of North America are proposed for critical habitat for marine turtles.

The beaches were chosen are those able to support the highest density of nest among the genetically and geographically distinct populations of loggerheads.

Loggerheads were listed as a threatened more 30 years ago. Today, the species is recognized as nine distinct population segments.

Later this year National Marine Fisheries Service is expected to designate the marine portions of the critical habitat as foraging areas offshore.

According to a study in the journal of *BioScience*, published in 2005, species with critical habitat for more than two years were more than twice as likely to have an improving population trend as those species without. ■

## Loggerhead turtles threatened by gillnet fishing in Baja, Mexico

Endangered loggerhead sea turtles migrate thousands of miles across the Pacific Ocean through deadly longlines and plastic pollution from their nesting grounds in Japan.

They arrive along the Baja California Peninsula in Mexico to

feed on red crabs and many stay for decades to grow and mature. The red crabs attract intense fishing, and the loggerheads are confronted with thousands of gill nets stretched across the Baja coast.

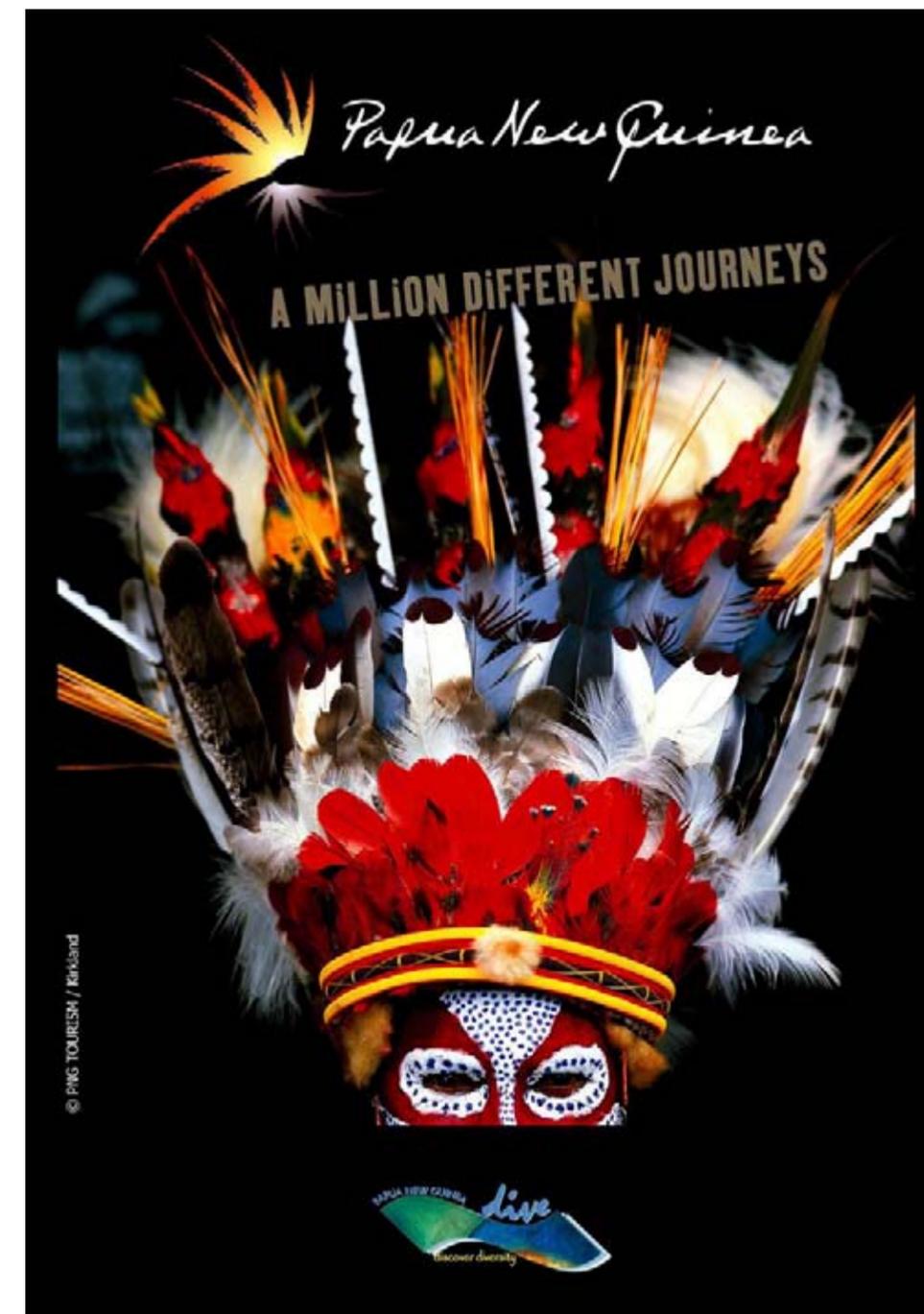
Last summer a 600 percent

increase in dead sea turtles was observed along the Baja coast, an area famous for gray whales and an important eco-tourism destination.

A shocking 483 loggerheads washed up on 40 km of shoreline last July and scientists estimate

more than 2,000 loggerheads were killed last year in gillnets alone.

The bycatch rate of loggerheads in Mexican gillnets is among the highest in the world and it is jeopardizing the survival of the turtle species. ■



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## LOVE SEA TURTLES? MAKE SURE YOUR KIDS CAN, TOO.

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## Hawksbill sea turtles are monogamous

Scientists from the United Kingdom have gained insights into the secret sex lives of hawksbill sea turtles. Little has been known of the mating behavior of this endangered species, as they spend most of their lives underwater in the far reaches of the oceans. The researchers studying the turtles in the Seychelles were surprised to find out that the animals were, for the most part, monogamous.

According to the study, which was published in the journal *Molecular Ecology*, the female hawksbill stores sperm from one male and uses it for fertilising several clutches of eggs. There are other species that practice this type of "sperm storage" including birds, reptiles and some tortoises, terrapins and turtles. But the females of these species store viable sperm from multiple partners for an extended period of time, which means that their eggs are at times fertilised by several males.

So the researchers from the University of

East Anglia, Norwich, studying the hawksbill turtles on Cousine Island in the Seychelles did DNA testing on hawksbill turtle hatchlings to find out how many fathers were involved in fertilised the eggs. Their findings showed that most of the egg clutches were fertilised by only one male. In addition, no males during the 75-day mating season had fertilised the eggs of more than one female.

Research team member Dr David Richardson told the BBC, "We were surprised that they were so monogamous

because ... genetic monogamy is actually the exception in most animals, not the rule."

But there isn't a lack of males for females to mate with, according to the study findings. "It's very unlikely that it's just a few males hanging around offshore," said Richardson. "We think they're mating with males a long way away, wherever they're normally foraging and feeding which can be all over the western Indian Ocean," he said.

It is important for the survival of the species that there is a large number of males contributing to the next generation of turtles. The more males, the more genetic variation. The higher the level of genetic variability, the better the turtles can respond to changes in environment, new diseases or other threats, said Richardson. ■

## State of California seeks more science before opening protected sea turtle habitat to swordfishing

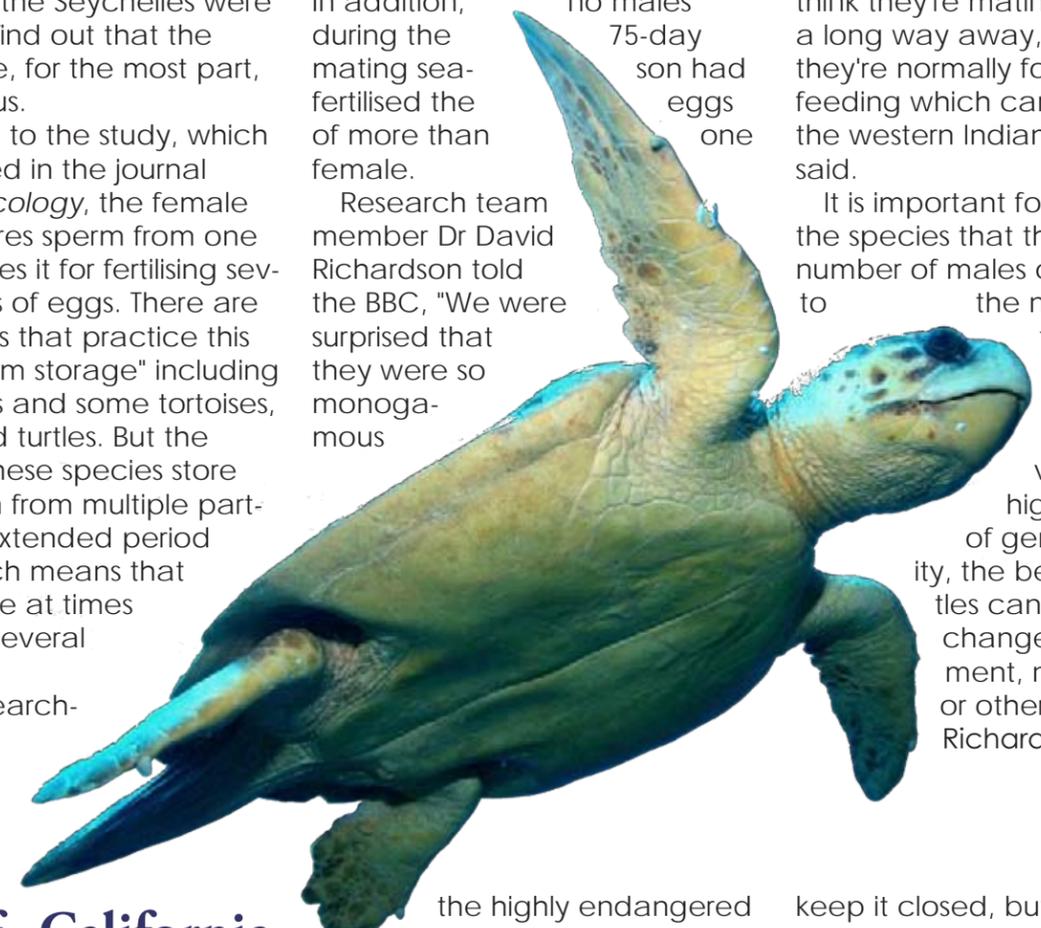
The U.S. federal fishery management voted to maintain the no-fishing zone along the California and Oregon coasts to protect

the highly endangered leatherback sea turtle for at least a year while they gather more scientific data. The fishery delayed immediate actions on expanding the California gillnet fishery into the Pacific Leatherback Conservation Area, but decided to take up the swordfish gillnet expansion in 2014 after another year of study.

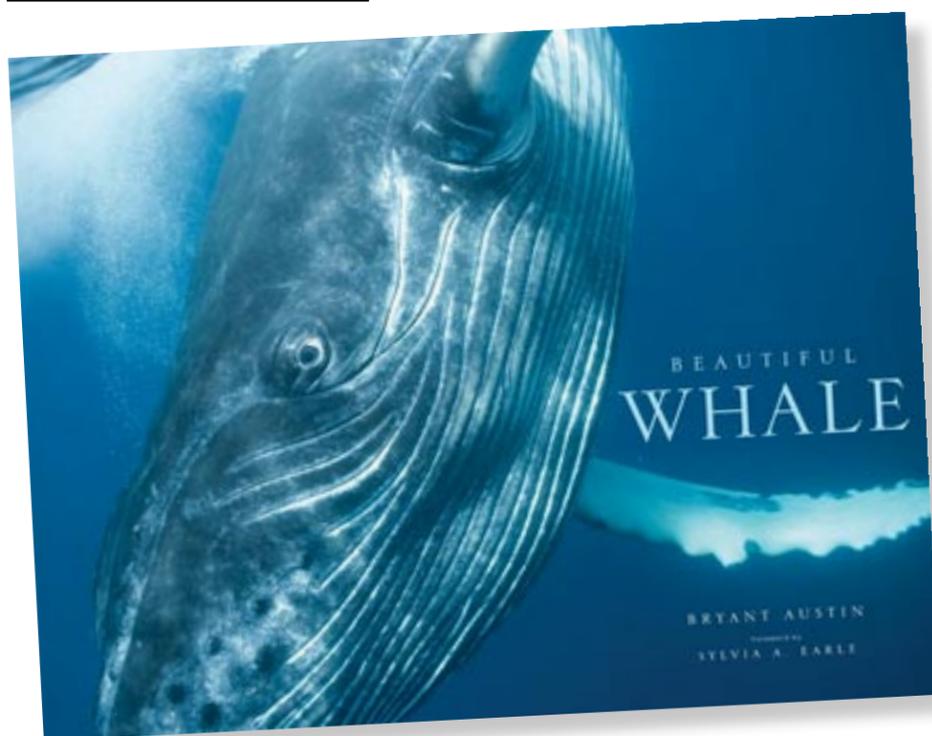
Teri Shore, program director of the Turtle Island Restoration Network said, "If they look seriously at the science, they will

keep it closed, but we fear politics, not science may dictate the ultimate decision."

Ocean conservation groups, the California Coastal Commission, California State Assembly, scientists and thousands of people have registered opposition to any expansion of the drift gill net fleet into protected sea turtle habitat. The action would increase the risk of entanglements of endangered sea turtles, whales, dolphins, sea lions, sea birds and thousands of unwanted fish including sharks. ■



Edited by  
Catherine  
GS Lim



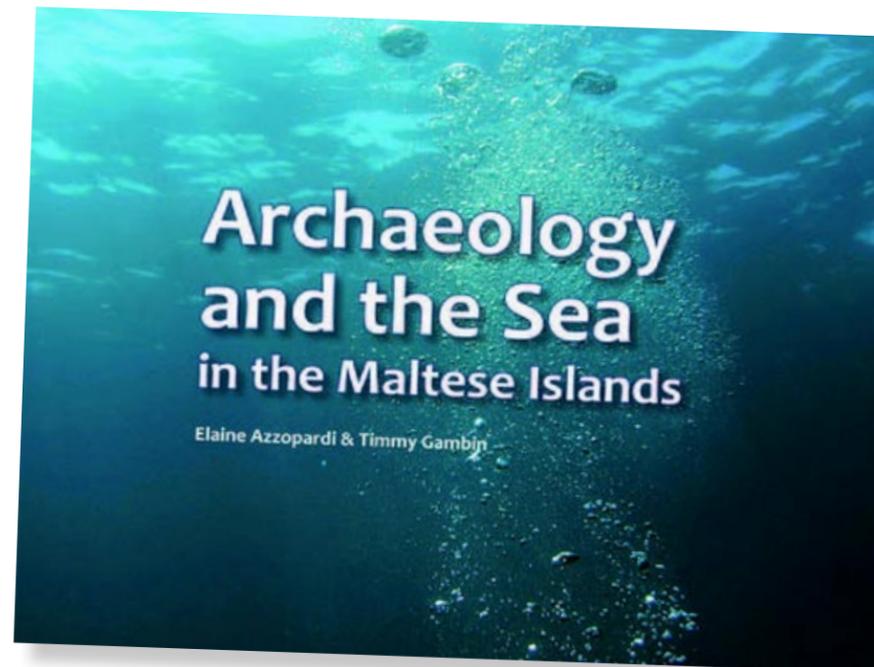
## Beautiful Whale

Photographer Bryant Austin's method of photographing whales is a testament to his dedication to his art and the passion he feels toward the whales. By immersing himself underwater for hours each day, remaining motionless, these giants of the oceans are more likely to approach him, sometimes coming as close as ten feet. The result is this impressive book featuring many close-ups and full-body portraits of these magnificent creatures. If the cover photo is anything to go by, this book is truly a beautiful work to be cherished by all.

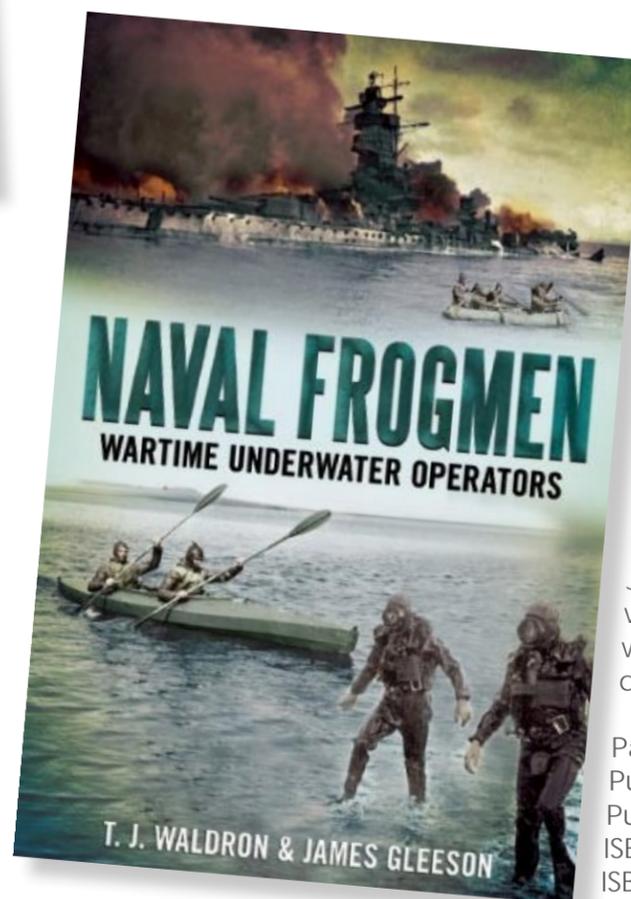
Hardcover: 124 pages  
Publisher: Abrams  
Publication date: 2 April 2013  
ISBN-10: 1419703846  
ISBN-13: 978-1419703843

## Underwater Archeology

Being in the centre of the Mediterranean Sea, Malta and Gozo are a familiar sight to ships passing through the islands' waters. In contrast, the region's maritime archaeology has not been in the limelight – till now. Thus, this book attempts to remedy the situation by examining the history of Malta's underwater archaeology and providing an overview of the some significant discoveries of the archipelago's seabed. If you intend to dive in this region soon, having a knowledge of its maritime archaeology can definitely enrich the experience even more! Read *Archaeology and the Sea in the Maltese Islands* by Timmy Gambin and Elaine Azzopardi.



Paper-  
back: 64 pages  
Publisher: Midsea Books Ltd, Malta  
Publication date: 28 Mar 2013  
ISBN-10: 999327402X  
ISBN-13: 978-9993274025



## Frogmen

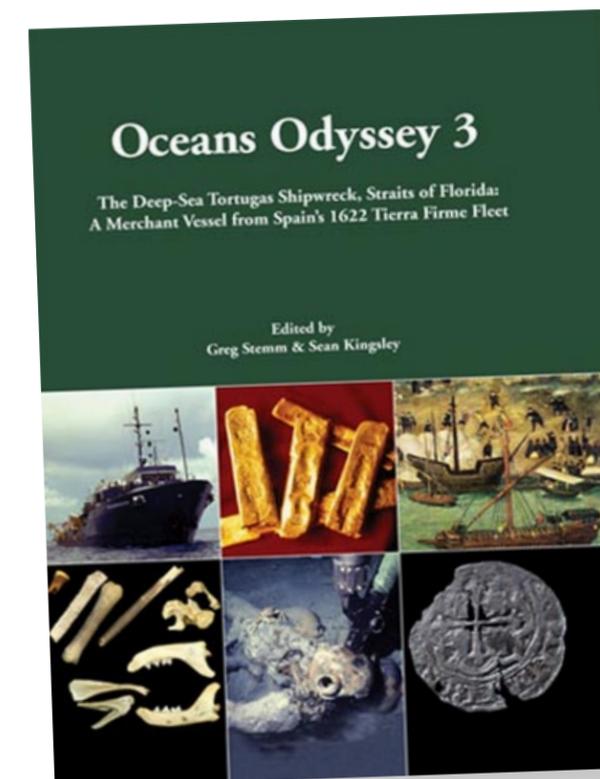
Never mind that their name could have been better chosen, naval frogmen are often key to the success of many naval missions. Completing their mission at great risk to their lives, they disregard all for the sake of their country. This book, *Naval Frogmen: Wartime Underwater Operators* by T.J. Waldron and James Gleeson, chronicles such clandestine missions during the Second World War, undertaken by the navel frogmen around the world. From British commandos seeking to defeat the German Navy, to the kamikaze frogmen of the Imperial Japanese Navy waiting for enemy warships with explosives attached to a pole. No matter where their allegiance may lie, their bravery and dedication is indisputable.

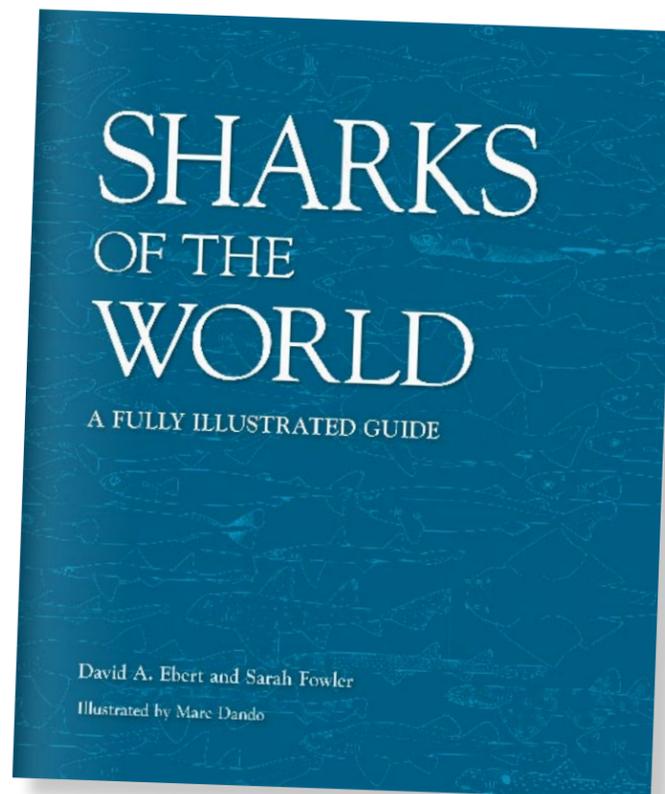
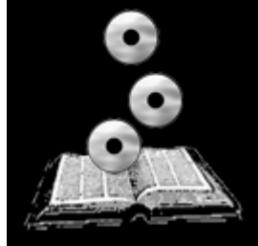
Paperback: 160 pages  
Publisher: Fonthill Media  
Publication date: 23 May 2013  
ISBN-10: 1781551723  
ISBN-13: 978-1781551721

## 17th Century Shipwreck

In 1990, an underwater excavation of a 1622 shipwreck took place beneath the Straits of Florida. Yet, this was no ordinary archeological dig (figuratively speaking), as this was the world's first robotic archeological excavation of a shipwreck, conducted by scientists controlling a remotely-operated vehicle. The wreck was the *Buen Jesús y Nuestra Señora del Rosario*, a Spanish-operated merchant vessel lost in a hurricane. The recovered artefacts ranged from gold bars, silver coins to beads, glassware and seeds, allowing us a glimpse into the daily life at the end of the Golden Age of Spain. To learn more, read *Oceans Odyssey 3: The Deep-Sea Tortugas Shipwreck, Straits of Florida—A Merchant Vessel from Spain's 1622 Tierra Firme Fleet* by Sean A. Kingsley.

Hardcover: 201 pages  
Publisher: Oxbow Books  
Publication date: 28 April 2013  
ISBN-10: 1782971483  
ISBN-13: 978-1782971481





## Sharks

At more than 520 pages thick, *Sharks of the World: A Fully Illustrated Guide* by David A. Ebert and Sarah Fowler, promises a very detailed account of sharks. Before the writers plunge headlong into the specifics of every shark species, they first provide a comprehensive round-up of the shark's ancestry, biology and habits, as well as its history, relationship and interaction with people. All the sharks are depicted in colour, and there are also line illustrations alongside the descriptions. Be sure to save some space on your bookshelf for this book!

Hardcover: 528 pages  
 Publisher: Wild Nature Press  
 Publication date: 31 Mar 2013  
 ISBN-10: 0957394608  
 ISBN-13: 978-0957394605

Text by Peter Symes

## *Innovative Methods of Marine Ecosystem Restoration*

Edited by Thomas J. Goreau and Robert Kent Trench

Haven't we all been there? Feeling exasperated and just wanting to do something to heal or fix wild nature which has been deeply affected, damaged or significantly altered by anthropogenic activities? I sure have.

Enter this *Restoring Marine Ecosystems*, which I cannot help think of as some sort of 'God's cookbook' or 'manual to creation'. As the title implies, various case stories and techniques are described as to how we can increase settlement, growth, survival and resistance to

stress in marine environments, to maintain diversity and productivity, and to rapidly restore devastated places where there has been no natural recovery.

Various chapters also describe how it is not only the growth of coral that is being sped up by application of electricity but also other flora and fauna is positively affected such as seagrasses and oysters. Electricity also seems to protect coral from overgrowth by encrusting sponges.

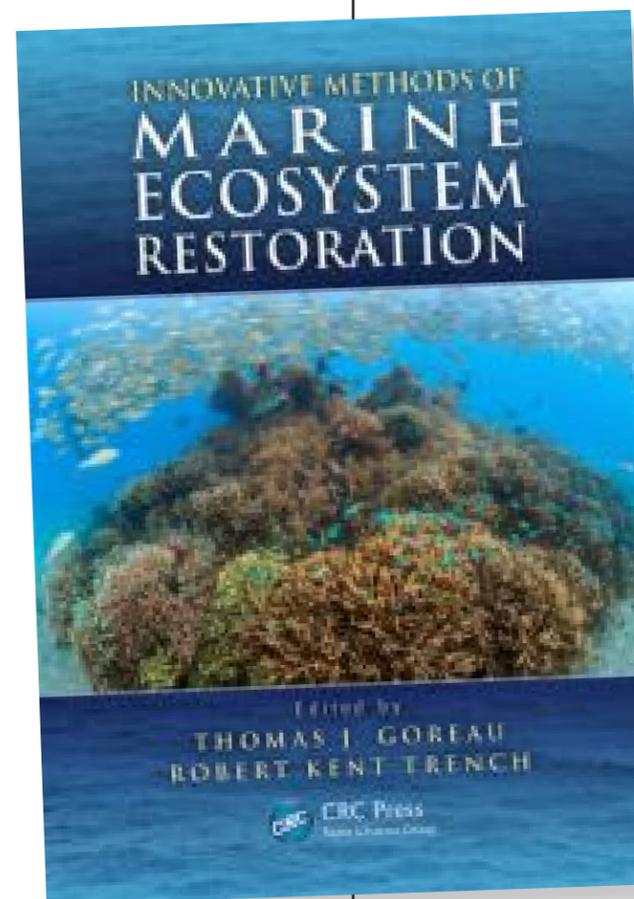
But also completely different techniques such as capturing and cultivating fish larvae for restoring fish stocks are described. One or two of the 19 chapters I found off-topic for my interests and liking but the rest I will definitely go back to several times over in order to fully absorb the knowledge presented. *Marine Ecosystems Restoration* is already placed within immediate reach on my shelf.

Hardcover: 312 pages  
 Publisher: CRC Press; Har/Cdr edition  
 Publication date: 4 December 2012  
 ISBN-10: 1466557737  
 ISBN-13: 978-1466557734

stress in marine environments, to maintain diversity and productivity, and to rapidly restore devastated places where there has been no natural recovery.

This is not a sexy coffee-table book laden with spreads of gorgeous underwater photography that you can casually browse through while comfortably reclined in a couch. This book provides you with the scientific insights and backgrounds and as such it requires study and immer-

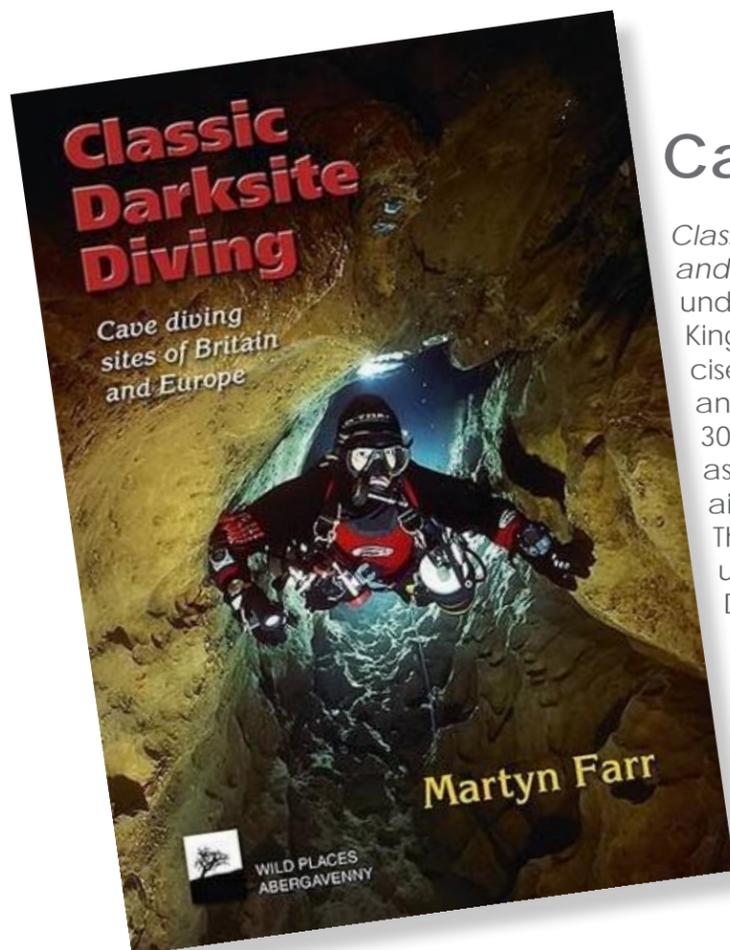
as such it requires study and immer-



## Cave Diving

*Classic Darksite Diving: Cave diving sites of Britain and Europe*, by Martyn Farr, focuses on 140 underwater caves and mines found in the United Kingdom and across Europe, detailing their precise locations, characteristics, exploration history and useful contacts. There are also more than 300 photos to entice you to visit the sites, as well as practical information like where to get an air refill to reacting to emergency situations. This book was written as a companion volume to the author's cave-diving manual *Diving in Darkness*, published in 2003.

Paperback: 192 pages  
 Publisher: Wild Places Publishing  
 Publication date: 6 April 2013  
 ISBN-10: 0952670186  
 ISBN-13: 978-0952670186





# *Finland's* **Ojamo Mine**

Text by Antti Apunen. Photos by Janne Suhonen



Divers at the surface prepare to dive Ojamo Mine. PREVIOUS PAGE: Diver inspects wheelbarrow in Ojamo Mine

—*Diving the Ojamo lime mine in Finland, 138 meters of water, 4°C.*

**Imagine sub-zero temperatures and a hole in the ice. That is your entrance to the underworld of Ojamo, the most popular diving site in Finland.**

Ojamo lime mine is situated 60 kilometers west of Helsinki. It attracts thousands of visitors every year. The mine area is part of the city of Lohja, known for its industry.

The mining operations began here in the 19th century. When the open pit got too deep, mining was taken into the tunnels. More technology was introduced to boost the human powered opera-

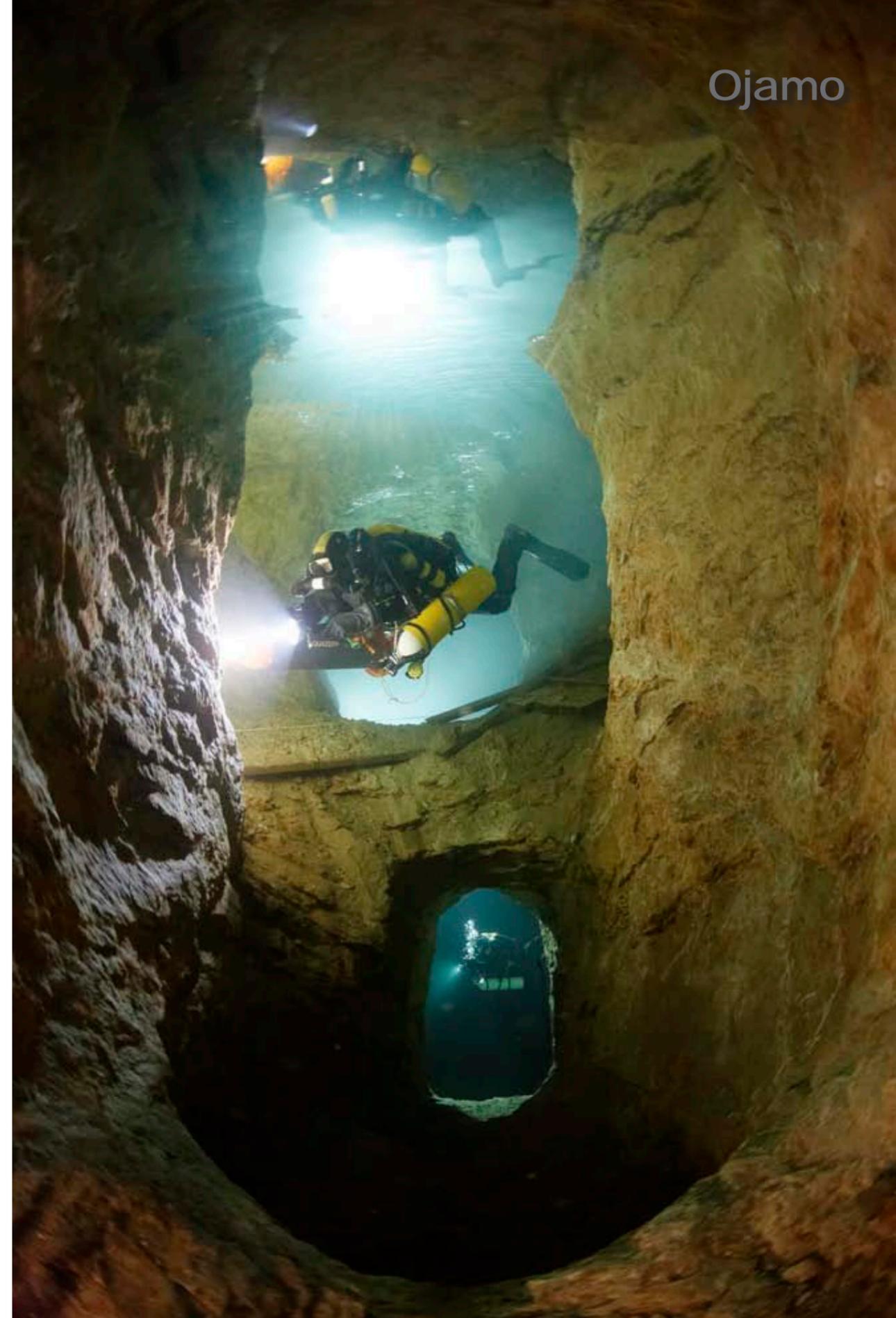
tions. Ojamo mine was a key driver of development for the area for decades. It fuelled the local economy and provided work for the locals.

When Finland entered the war with Russia in 1939, the mine was turned into a prison camp. The prisoners worked in shifts and lived miserably in tents at the bottom of the open pit. There weren't enough clothes for everyone, so the prisoners exchanged mantels between shifts.

Today, since water filled the mine, it looks just like another small lake inside the forest. The shallowest tunnels start



at a depth of 28 meters, from the bottom of the open pit. The mine reaches a depth of 250 meters at the bottom of the main mining shaft. The exact depth



Exploring passageways of the mine; Historical image of Ojamo Mine (left)

Mario World is one of the most visited areas of Ojamo Mine; Historical image of workers in Ojamo Mine (below)

All this makes planning dives easier than in a natural cave, as the multi-level plans can be reasonably accurate compared to natural tunnels going up and down all the time. It means that there are no reverse profiles either.

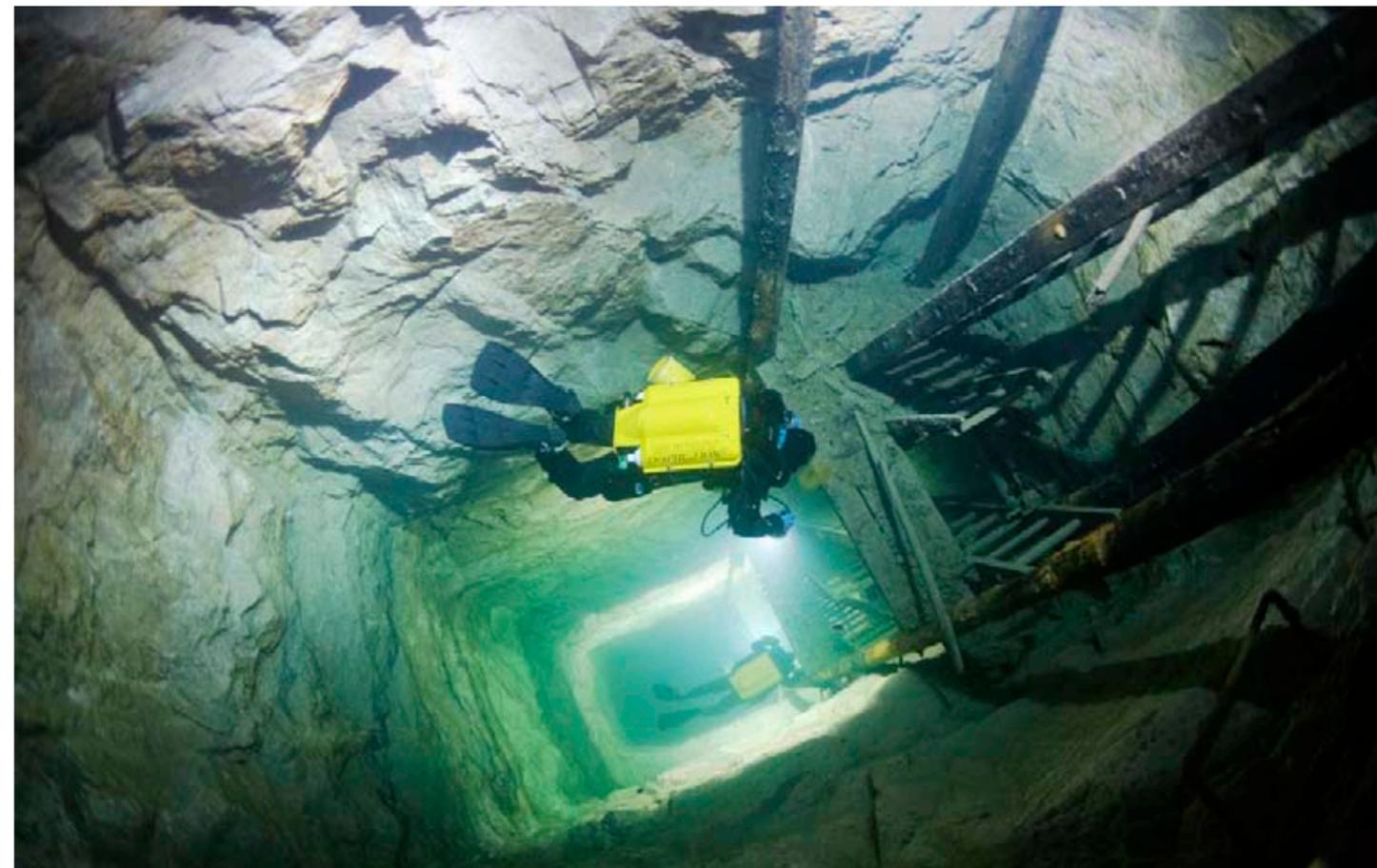
In Finland, there are no natural caves suitable for diving. The ground is solid granite, which is too hard for water to carve underground rivers into. Even the limestone at Ojamo is tightly squeezed inside hard rock where carbon dioxide cannot eat its way through the stone. From the mine diving point of view, granite has many benefits. The corridors



and vast halls are stable even without supporting structures.

There are many closed mines suitable for diving in Finland. Many of them have been closed only recently, or there is no required diving infrastructure for various political or geographical reasons. One example of these kinds

of sites is the Outokumpu mine, a name known globally because of the mining company that started its operations from that very spot. Today, Outokumpu is one of the leading stainless steel and copper manufacturers in the world. For



Divers explore ventilation shaft in the mine going down from the 28 to 56-meter level

is not known, as there was some land-fill done in the shaft after the mine was closed. The deepest recorded dive at the mine is 160 meters.

The water level reaching ground level makes diving easy at Ojamo. Divers can park their cars next to the lake and jump into the water. In many other places, like the popular Tuna Hästberg iron mine in Sweden, gear needs to be lowered deep into the mine with winches, tens or even hundreds of meters, before reaching the water level.

The huge mining halls are quite an experience. I remember vividly my first dive into one of these huge cathedrals. My hands started moving in circles, as if I was falling down from a cliff. The crystal clear water and dark depths deceive the eye of the inexperienced. When in operation, the mine was not a place for a

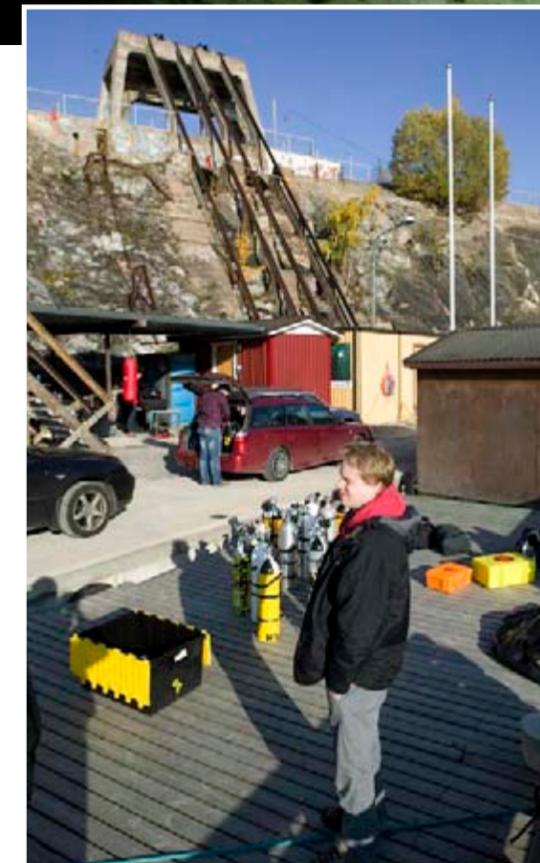
person with bad nerves or a phobia of heights.

The halls are sometimes so big that no walls can be seen when crossing them. The only guide is the white line running through the emptiness. These chains of halls can be quite confusing. In a natural cave, it's sometimes easier to remember details. In a mine, the mechanical marks of mining all look the same.

### A country without natural caves

There are many kilometers of tunnel at Ojamo, although the longest continuous stretch is only 1.7 kilometers, at the 88-meter level.

There's also little variation in depth on each level; the tunnels run almost horizontally. There are plenty of shafts and mining halls that are used for travelling from one level to another.





Personnel elevator shaft at 56-meter level (above)



divers, the name means multiple kilometers of unexplored territory.

Many of the mining sites are in remote places. This means that their number of visitors is low compared to Ojamo, even when they are otherwise quite suitable for diving. One of the popular sites, Montola, was closed for a while because of a recent fatality—one of the few ones in the short history of Finnish cave diving.

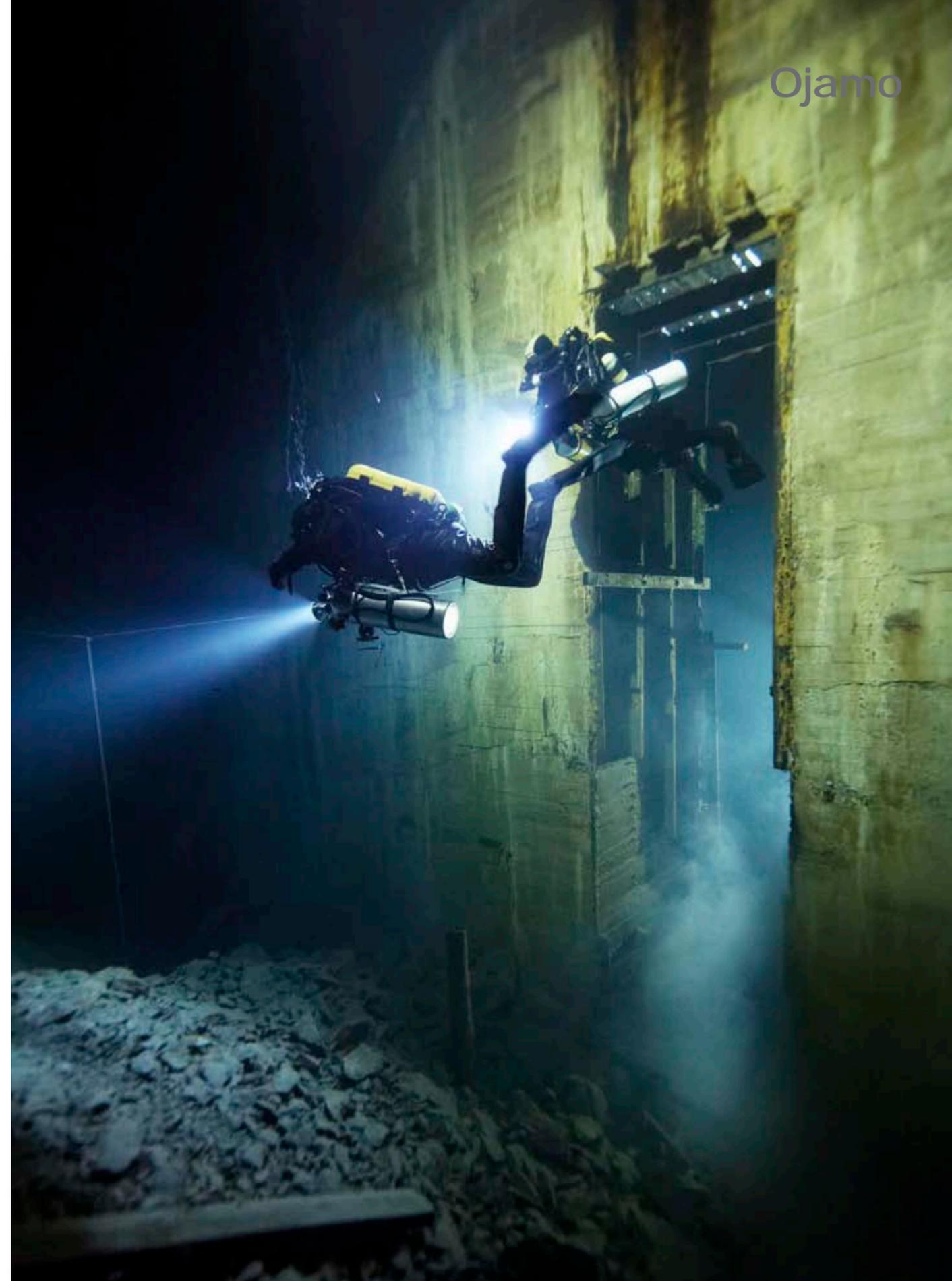
The Montola accident was a typical cave diving accident, with the added local environmental characteristics. The water in the open pit was very murky, with a summer time visibility of only one meter or so (during winter the water is clearer, as there is algae in the water in the summer). The visibility probably played a part in the accident, as the team members got separated and did

not recognize the shortest way out, even though the entrance was never very far away. So even in mines with almost no flow, the circumstances can be treacherous.

### Great halls of dark granite

Ojamo mine has been dived for almost 40 years. The mining came to an end in the mid-1960s. The market price for lime had declined, and there was no financial point in continuing operations. After the mine closed, it slowly started to fill with water. With many kilometers of tunnels, it took quite a number of years before the water reached ground level.

The good news was that the mine was filled with ground water that had been filtered by thick top soil and gravel. The water inside the mine tunnels was crystal clear. The northern



Hell's Gate was built to support rock between the mine and the lake bottom above

Diver explores workshop at 88m level



## Ojamo

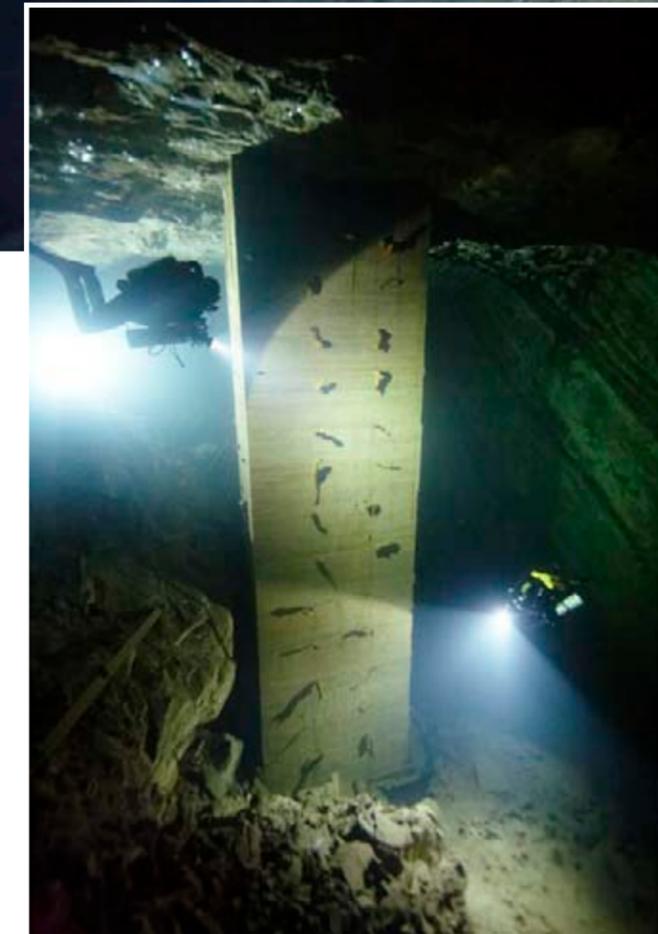
Location of Ojamo mine on global map and map of Scandinavia



were considered remarkable by the standards of the time. Today, with all sorts of rebreathers around, these two to three-hour dives don't seem anything out of the ordinary.

The major limiting factor at Ojamo has always been the cold water. The constant 4°C at the bottom makes sure that any dive over three hours is always a bit of a challenge. Today, heated vests and the fixed habitat make things easier. But even now, five or six hours in the chilling water can be torture—not to mention, hazardous, if anything goes wrong with the suit. Dry gloves are imperative. Wet gloves simply can't protect against water that cold for hours.

The traditional Finnish style is to dive with thick, custom-made rubber suits. These *Loitokari* suits are a Finnish phenomenon, which often amuse foreign divers. But there are certain advantages. The rubber suit seems to be almost impossible to tear. Remembering the cold water, this consideration is quite important.



lakes lack large mammals and other animals for the most part, but perches, northern pikes and burbot quickly populated the open pit and its murky waters. Crayfish followed soon after.

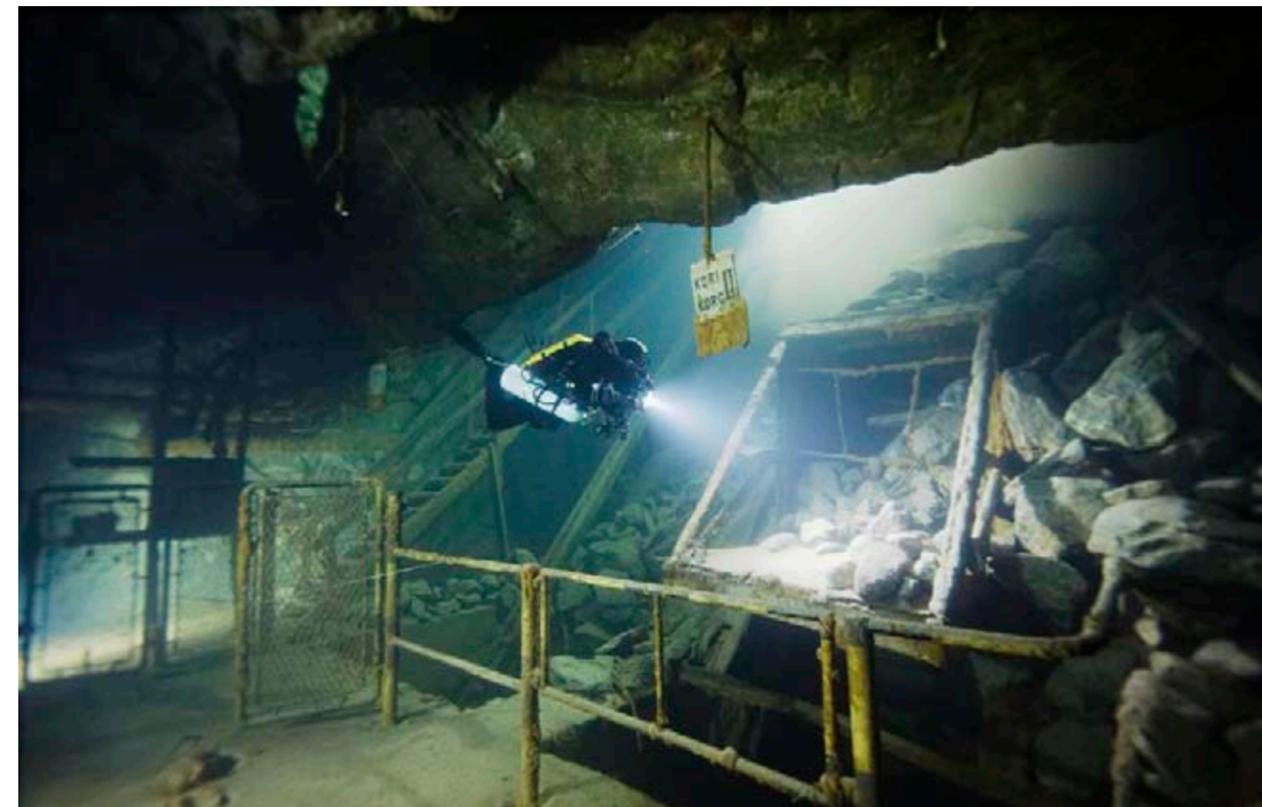
The early attempts to explore the mine were restricted by primitive cave diving equipment. Finland was far away from the influence of central European and North American cave diving communities. Diving was done mostly in the Baltic Sea by military and professional divers, and they were not too interested in exploring very deep into the mine. Their techniques and equipment were tuned to wreck diving and typically lacked the redundancy and capabilities required for deep cave diving.

In the beginning of 1990s, mixed gas technical diving started to take hold.

First, non-military rebreathers were imported, around the turn of the millennium. That was also the time when cave diving training became more popular among Finnish divers. Before that, local rules and personal relationships primarily dictated who could dive and where.

The first expeditions charted the mining level at 28 meters. The largest part of the level became known as the Pearls, consisting of 13 big mining halls connected to each other with narrow passages. The level was suitable for open circuit nitrox diving, so it was mapped quite quickly.

The next step was the 56-meter level. Air was still the most common diving gas, so the level remained well inside the air diving limits. It was explored all the way back in the beginning 1990s. The dives



Lucifer's Pillar supports the Hell's Gate at 75m

Old mining cart at the 138-meter mining level is still waiting for the next load



Divers use underwater scooters to navigate mine (above and right)



## Scooting around the forest

Some exploration was done at the 88-meter level in the early days, but the exploration came to a halt when the practical limits for open circuit dives were reached. It took a few years before rebreather diving techniques were updated to the requirements of 88- and 138-meter level push dives.

The 88-meter level was explored all the way to the end beneath Lake Lohja in 2008. After that, the focus has been on the 138-meter level. There are still plenty of tunnels to explore.

Most techniques used in diving the mine are similar to those used in diving natural caves. Divers follow maps when they dive in natural caves, unless exploring. Similarly, in a mine, you typically have quite a clear idea of the routes, as the mines are well documented. Of course, the maps don't reveal everything, and three-dimensional reality

is often surprisingly different from the old drawings.

The conditions in a mine don't vary much. The temperature is constant at depth. Only the surface water in the open pit warms up in the summer time to about 20°C. Fins primarily use argon as the drysuit gas. Bigger molecules seem to insulate better, although there is no precise scientific evidence supporting the habit. Staying warm is the main priority on any dive. Even just one hour in cold



Tool cabinets at the 88-meter level

water, unprotected, can be fatal or at least a main contributor to decompression sickness (DCS).

There are no currents in the mine, and the visibility at depth rarely changes. However, the surface water is a different story. During summer, it's all murky. The visibility drops to a meter or sometimes even less. Even though the decompression hours are warmer, the zero visibility poses a different challenge.

There is silt, as in a natural cave. With no current, the ceiling in the previously un-dived sections of the mine can release plenty of silt when hit with bubbles.

The mine is full of signs of human presence. Tools have been laid down where work was last performed. The rails and mine wagons still seem like they are waiting for another cargo load to take to the surface. At the 138-meter level, nothing has been touched. Layers of silt cover everything, but you can still recognize most details.

The light bulbs hang from the ceiling as if the lights could be turned on again.

Hammers wait for their users. Neatly piled dynamite boxes seem like they were placed there yesterday.

In the open pit, trees still stand. During the winter, when there is an ice cover on top of the lake, the light plays its own tricks. It is a wonderful scooter ride through the silent forest. It makes the long and cold decompression hours easier to manage. ■

*For more information about Ojamo mine and the authors, please visit [Diversofthedark.com](http://Diversofthedark.com). Further details about visiting Ojamo mine can be found at [Kaivossukeltajat.com](http://Kaivossukeltajat.com).*

