

Text and photos by Barb Roy

Over ten years have past since my last dive in Hood Canal. I'm not sure why, probably because I've been so focused on exploring the pristine waters of British Columbia that the extra effort of driving so far south has always deterred me. But when Adventures Down Under, a dive shop in Bellingham, invited me to join their group for a Hood Canal dive charter, I was too curious to say anything but yes. What I do remember from my last visit is seeing a field of tall, spindly sea whips during a shore dive and admiring the amount of octopus on another. I also remember how good some raw oysters were after picking them up from a beach during a community seafood festival, especially when they were covered in red cocktail sauce!

But for this trip our group of seven met up with Don Coleman, owner and operator of Pacific Adventure at the Pleasant Harbor Marina on the west side of Hood Canal,

off Highway 101. It was a typical chilly January day where air temperatures may have climbed to a balmy 30°F (-1°C). I was just happy for the warm sunshine and

pleasant attitudes all around. The distance to carry our gear from the car to the boat was short, and the 38-foot (11.5-meter) boat had plenty of covered deck space

to spread out on. A warm cabin below was great for changing into our dry suits.

During the 30-minute run to Pinnacle, our first dive site, Don

explained a bit about himself and how he got started in the dive business.

"I learned to dive in 1997 in San Carlos, Mexico, with my son

while on a four-year family sailing trip. We crossed to Hawaii in the spring of 1998 where I became an instructor, then we went back across to Washington State in the



*Washington State's*  
**Hood Canal**



Ron Akeson (left) filming a large lingcod at Hood Canal; Pacific Adventure dive boat, *Down Time* (above); Divers Connie and Jay ready to test new drysuits (top right)

### Pinnacle

Fortunately the Pinnacle site yielded calm water, fairly clear visibility and the sun was still smiling! The boat utilized one of the mooring buoys placed by Washington Scuba Alliance (WSA) and tied up to it. The mooring buoy would also be used as a descent line to directly drop onto the pinnacle below.

“Currently we have four WSA buoys in Hood Canal—Pulali West Wall, Pinnacle, Broken Leg and Flagpole,” added Don, just before his briefing.

“Pinnacle is my favorite site for the variety of struc-

tures at the location and the abundance of critters. The site is large enough that I don't have to see the same parts each dive. For me it takes at least three 50-minute dives to completely explore the entire site, I move pretty slow.”

He continued to tell us more about the site, directions to find critters and depths. As soon as Don mentioned a

pair of wolf-eels with eggs, everyone instantly became enthusiastic about jumping in as soon as possible. Only during a behind-the-scenes tour at the Vancouver Aquarium had I ever seen a ball of wolf-eel eggs before.

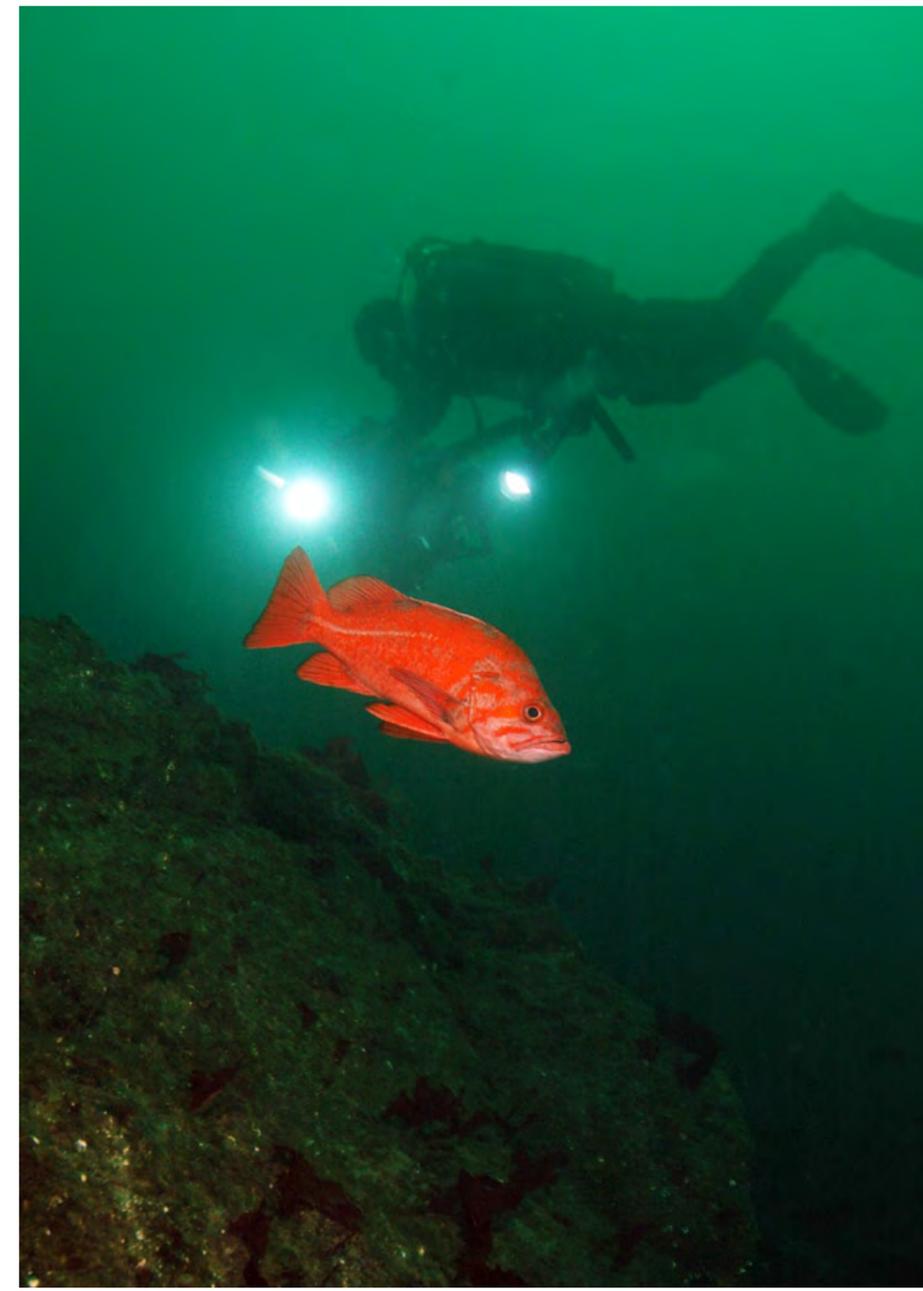
To increase my chances of actually finding the wolf-eels, I joined up with Ron Akeson, the group organizer and a marine biologist, figuring if anyone can find them he could. Although my Nikon camera is housed in a fair-sized Aquatica housing with duel strobes, it seemed small in comparison to his massive video housing with duel lights as they sat next to one another on the deck.

Nevertheless we began our descent to 40ft (12m), passing several immense lingcod resting on slabs of rock—I would guess probably females because of their size, ready to disperse clusters of eggs if the right guy comes along. When I approached for a photograph, they didn't budge. We even came across several small males, already guarding batches of eggs. They too were docile except for one that became fixated on my yellow Force Fins, swimming around several times before

spring of 1999 where I learned to dive in cold water. In the spring of 2002, I started my dive charter business and have had a blast exploring and sharing Hood Canal since then,” he said.

When asked how many boat diving sites he frequents in Hood Canal, he replied, “We have six dive sites that are favorites—Pulali East, South and West Walls, Pinnacle, Broken Leg

and Black Point. Another four we do on request as weather and current allow—Rosie's Ravine, Arrowhead, Flagpole and Elephant Wall. Most sites are not current sensitive except Rosie's and Flagpole. For us, wind is the major factor when choosing a site. Our popular shore dives include Sund Rock, Octopus Hole, Jorstead Creek, and Point Whitney.”



Diver with vermilion rockfish





escorting us away.

Large black, copper and yellowtail rockfish were very prevalent at all depths, some free-swimming and some perched on rocky outcroppings of the sloping terrain. Then all of the sudden a bright orange fish swam by. We were both in awe. Probably one of the most colorful of all the rockfish is the vermillion, displaying deep rich colors of red and orange, like this one.

To our delight more appeared. Judging from their size and quantity, this might be a resident population. They didn't seem to mind having divers around, because I was able to collect numerous shots

as they gracefully swam about.

According to the book *Coastal Fishes of the Pacific Northwest* by Andy Lamb and Phil Edgell, a large female vermillion is capable of releasing as many as 2,600 tiny young, usually during the winter.

Since Ron and I were the last ones in the water, we didn't really see much of the others on our dive. I spotted a lone adult male wolf-eel in a den and was taking advantage of its tolerance to my camera when Ron signaled me over. Okay, maybe he found the pair of wolf-eels!

At first I did not see the smaller female wrapped around a yellow-



lowish-white ball of eggs, until I got closer. The male quickly let us know where the parameters were and as long as we respected the distance, he was content. The egg mass was about the size of cantaloupe melon. Unfortunately using a wide-angle lens on my camera didn't help much, but Ron acquired some fabulous footage which he later shared.

"I have not done a lot of diving in Hood Canal previously," admitted Ron, "But after doing a day of diving with Pacific Adventure, I wondered why not. Naturally I survey an area for the health of its marine life while diving, trying to note its diversity. Seeing the pair of wolf-eels and lings with eggs tells me this area is doing okay. The wolf-eels were a real treat to see and they were exactly where Don said they would be during his briefing, so it just was a matter of finding them."

The rockfish were a big hit with Ron as well, "The biggest surprise for me was the health of the rockfish populations in Hood Canal. At Pinnacle there were numerous

large vermillion rockfish, a species I rarely, if ever, see in Puget Sound or the San Juan Islands."

Later Ron sent me several images of the wolf-eels with their

them how they enjoyed their dive. Jim Copher and Mike Meagher, also from Bellingham, were out on the boat testing a new housing Mike has constructed for the

## Hood Canal

bundles of life, which he took from his video. Very cool.

### Pulali Point

The second dive location, Pulali Point, was not far away, marked by another WSA buoy. As we enjoyed a hot cup of soup and a delicious sandwich, I chatted with the other divers, asking

GoPro camera.

Mike commented, "While Hood Canal does not appear to have the invertebrate life the San Juans do, I am still looking to do more dives here. I love diving at Pinnacle because there are always wolf-eels and lings when we visit it. And I like Don's boat and his crew. He does a very professional job of briefing the divers, and tells you with great accuracy where to find subjects. That sort of knowledge is beneficial to the underwater filmmaker, allowing us to go right to the subjects we desire to get shots of. Jim and I will be back on Don's boat soon. I do have some decent video posted on YouTube from the Pinnacle site and Hood Canal." [See <http://www.youtube.com/wolfeeldiver>]

More of Mike's videos can be found on YouTube by doing a search for "MikeMeagherProduc-



Wolf-eels protect their eggs and nest (above); Male wolf-eel hiding in crevasse (far left); Striped sea perch (top)



LEFT TO RIGHT:  
Sunflower seastar;  
Vermillion rockfish;  
Lingcod, starfish  
and sea cucumber  
on rocky reef

in many parts of the world.

When checking out a crab crawling around a possible octopus den, I noticed a small painted-greenling fish, camouflaged upon some dark red and brown pieces of kelp. Sometimes I just like to pause, admiring little creatures like this (I still had my wide-angle lens on) and watch how they go about foraging. Even the huge boulders we found covered with

tions" to locate his channel.

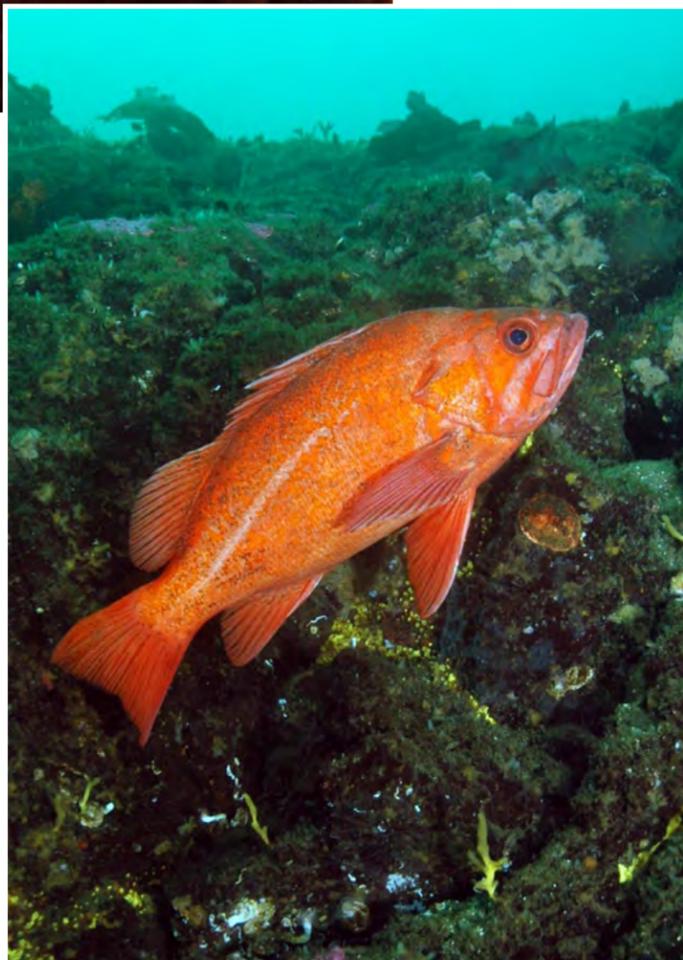
Mike hopes to have his new housing available to market in a few months, which according to him will be "unique in the world". He also states it will have improved underwater optics and oversized controls for divers wearing gloves, not to mention it has already been pressure tested to 330 feet.

Another buddy team was Connie Zastrow and Jay Lonner, testing out their new drysuits. "In my heart of hearts, I'm a tropical water diver," said Connie, "but, that being said, I want to love cold water diving, and I thought Hood Canal was a great place to take the plunge. It really was a good place to start—small boat, attentive crew, no current and plenty of interesting things to see." Both Connie and Jay hope to return this spring for more exploration.

Ron and I entered the water (was it colder?) at Pulali and followed the mooring buoy line down to the site. Tall white

plumose anemones decorated the rocky landscape. Connie and Jay waved as they passed by, heading deeper. The descent was not as steep as the previous dive but a nice stretch of wall allowed me to get below more large lingcod. I've always loved the emerald green hue of northwest water when shooting upwards to frame my subjects in.

Lately I have heard there are dwindling sea star populations in many parts of the northwest, baffling scientists. Some areas have been devastated. Here in this part of Hood Canal they all seemed fine. Many believe pollution is the cause and others feel it is a natural cycle since it has happened before. My bet is that pollution is the culprit, because other marine species are also dwindling in some areas—a trend I am seeing



## Hood Canal

yellow zoanths had tiny critters between their tiny yellow bases when you look close.

After coming across Mike and Jim with their new proto-type on a quad-pod and waving at the camera, we headed for a group of copper rockfish. Each fish seemed to have their own special area on

the reef, as did the vermilions. However, black rockfish were everywhere.

Before long it was time to ascend. While hanging around the 20-foot depth (six meters), I watched a dozen striped perch bounce about from one rock pile to the next like the small groups of fish do in the tropics with coral heads. Their silvery irides-



Painted greenling resting on rocky reef (above); Diver with video camera at Hood Canal

## Hood Canal

needing air or Nitrox fills, Don is able to accommodate at his dock and can provide rental tanks for those diving with him. Be sure to reserve before hand. Divers can also rent gear and have their tanks filled at Hoodspot 'N Dive.

Another oceanfront fill station can be found at Mike's Beach Resort in Lilliwaup, on Highway 101. They offer accommodations and beach access (fee applies to non-resort guests) to the site called Flag Pole. I watched a couple of video clips on their website and now want to dive there to photograph their cloud sponge gardens! Ron ad-

vises to bring a dive kayak though. Next trip...

For more information visit: [www.pacadventure.com](http://www.pacadventure.com) or [www.pleasantharbormarina.com](http://www.pleasantharbormarina.com). ■

rooftop seating."

One of the things I always like to ask local operator about their special segment of the diving world is if they have ever experienced any awe-inspiring encounters. Don answered, "Hard question, too many memories,

like my first yelloweye rockfish, first wolf-eel eggs, first six gill shark, and many special memories diving with new and old friends. But one dive in January of 2011 I sighted three six gill sharks on one dive!"

"Yes, yes?" I persisted.

"I was fortunate to see three six gills on one dive, the site however is at or just beyond recreational limits for depth so I hesitate to say much more. Over the years six gill sightings have not been uncom-

mon at several of our sites. If we wanted to name one site with the most sightings within recreational limits it would be Rosie's Ravine. We have also had sightings at Pualali Point, Rosie's, and Flagpole. Usually the most likely time to see them has been mid to late summer."

I was happy with my one-day dive charter in Hood Canal and plan to return in March when Ron and his group will spend two days exploring the area. I am excited to check out some of the other sites where I can also take my kayak out when not diving. The water is calm enough, at least where we were, paddleboards can also be enjoyed. Don has suggested other activities like a drive up the river valleys or a day hiking in the Olympic National Park.

Just last year I spent a couple of days hiking the Mt Townsend

trail and Hurricane Ridge where I was able to collect some breathtaking imagery of wildlife and scenic mountain views.

For visiting divers to Hood Canal

cent blue bodies shimmered in the sunlight to the point I had to catch a few images of them.

### Upgrades, awesome tales and topside excursions

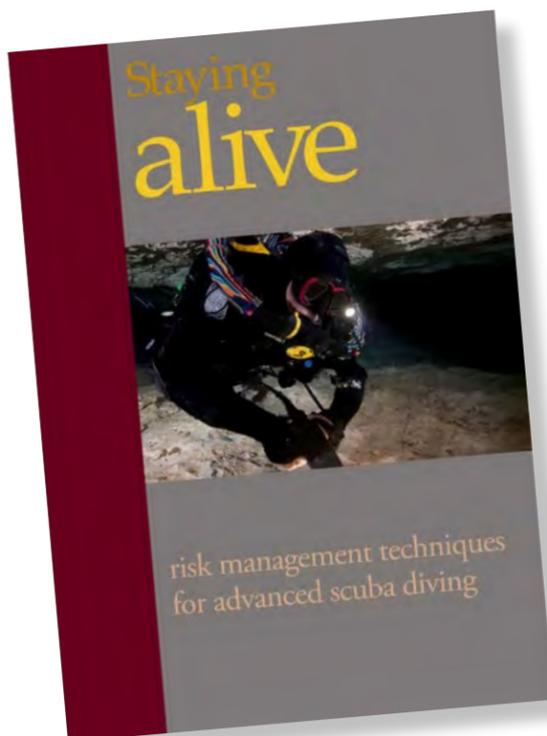
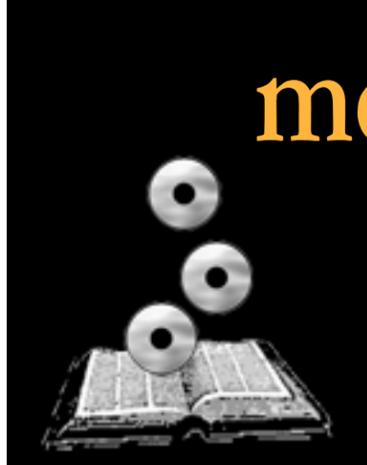
On the way back to the marina, after another cup of hot soup and a couple of freshly baked chocolate chip cookies, Don said, "My wife Diane manages Pleasant Harbor Marina. Over the past few years upgrades included replace-

ment of old wooden/Styrofoam floats with composite docks, a new fuel dock, a new pool and hot tub for tenants, remodeled restrooms, showers and a laundry facility. We offer permanent and transient deep-water moorage for boats up to 120 feet. By mid-June we will complete replacement of our old main building with a new building where we will have a restaurant (we're famous for our pizza) and an upstairs pub with outdoor

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## Don't become a statistic

*Staying Alive: Applying Risk Management to Advanced Scuba Diving*, by Steve Lewis.

Follow author and technical diving instructor-trainer Steve Lewis as he outlines eight straightforward steps that both sport and technical divers can follow to stay safe on a dive. Originally proposed by cave and deep diving legend, Sheck Exley, these guidelines help divers avoid the mistakes that are often the result of ignoring established limits. There are very few diving accidents, according to Lewis. Many unnecessary deaths were completely avoidable. This is a must-read for every conscientious diver, whether recreational or technical.

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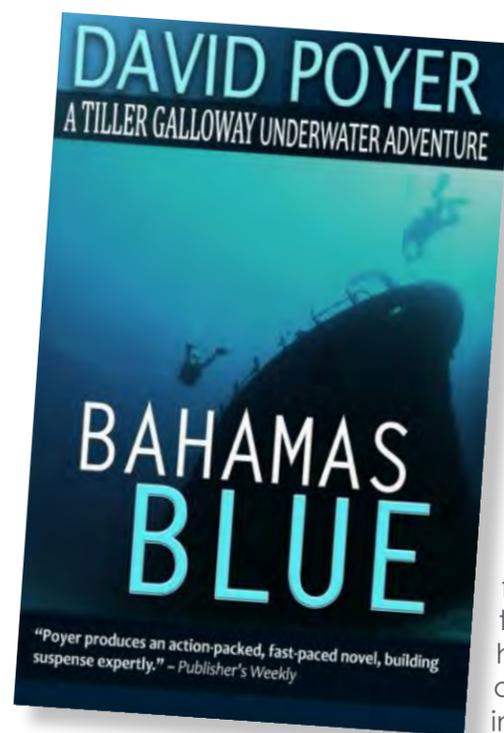


## Plastic Gyre

*Gyre: The Plastic Ocean*, by Julie Decker

The oceans are awash with our plastic debris. Huge gyres of plastic garbage are swirling with our trash. But a few clever artists are creating new art out of the litter and raising awareness to the issue at the same time. This book explores the relationship between people and the ocean, where the cast-offs of our culture of consumption are creating an ever-growing environmental catastrophe.

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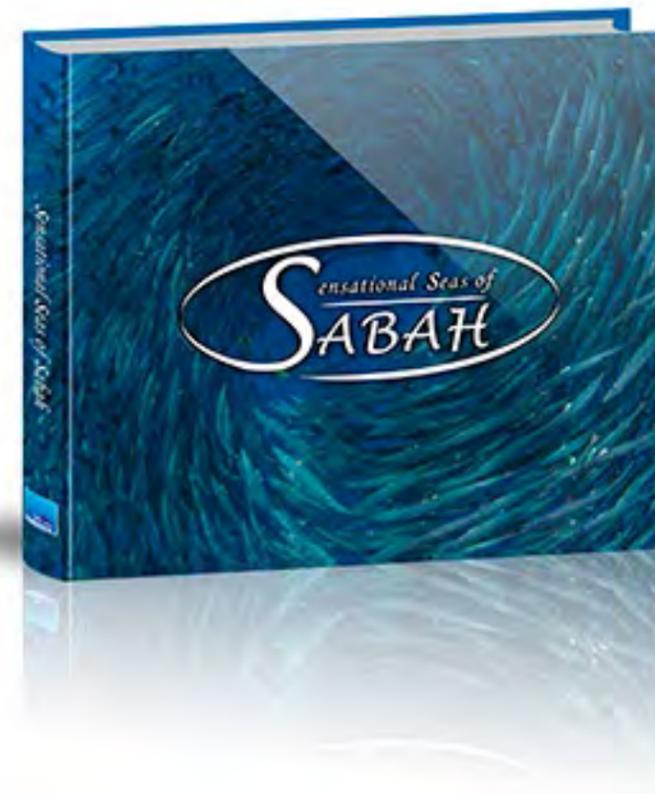


## Sea Adventure

*Bahamas Blue*, by David Poyer.

Dive fiction at its best, according to notable sources such as Clive Cussler and the New York Times Book Review. Best-selling author Poyer's sequel to his previous novel, *Hatteras Blue*, takes the reader into the world of salvage diver and ex-con Tiller Galloway who finds himself working again for "The Baptist"—a menacing kingpin Galloway vowed never to work for again. But it was an offer he could not refuse—raising 50 tons of sunken cargo off the Caribbean Sea floor. The plot takes our hero on a dive teetering on the edge of death, amid conflicts, hostile islanders and government corruption, as the sinister scenario unfolds in a captivating and vivid underwater escapade.

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## Biodiversity hotspot

*Sensational Seas of Sabah*, by Scubazoo.

Compiled by Scubazoo—an independent production company of underwater cinematography and photography based in Kota Kinabalu, Sabah, Malaysian Borneo—this beautiful coffee table book will entice any diver hungry for the biodiversity and rich coral reefs found in the heart of the Coral Triangle. A magnet for divers, Sabah boasts glorious tropical islands, clear warm waters and sandy beaches. Species such as the endangered hawksbill and green sea turtles, sharks and thousands of jacks and barracuda can be found here, as well as rare creatures such as the mimic octopus, harlequin ghost pipefish and flamboyant cuttlefish, images of which you can find in the brilliant, colorful pages of this book.

To order, go to: [www.scubazoo.com](http://www.scubazoo.com)



Edited by Kelly LaClaire

## Extinct mammals of the Ancient North Pacific revealed in study

Robert Boessenecker, a Geology PhD student at New Zealand's University of Otago, has released in the international journal *Geodiversitas*, revealing that before the last Ice Age, many strange mammals, now long extinct, lived in the waters of the North Pacific.

Studying hundreds of fossils he excavated from the San Francisco Bay Area's Purisima Formation, Boessenecker pieced together bones and teeth of 21 separate marine mammal species including: dwarf baleen whales, bizarre double-tusked walruses, odd porpoises with severe under bites and a dolphin closely related to the now-extinct Chinese river dolphin

Among his finds, which were

fossilized 2.5 to 5 million years ago, was a previously undiscovered species of cetacean named *Balaenoptera berate*.

According to Boessenecker, his discovery belongs within the same genus as minke and fin whales, indicating that the *Balaenoptera* lineage has lasted for three to four million years. *Balaenoptera bertae* would have been approximately five to six meters in length, slightly smaller than modern minke whales.

### Excavation

The recent publication represents eight years of research by Boessenecker, who at the age of 18 was tipped off by a local surfer about bones near Half Moon Bay. When

he discovered the fossil site, he was astonished by the numerous fossil beds and hundreds of bones sticking out of the cliffs.

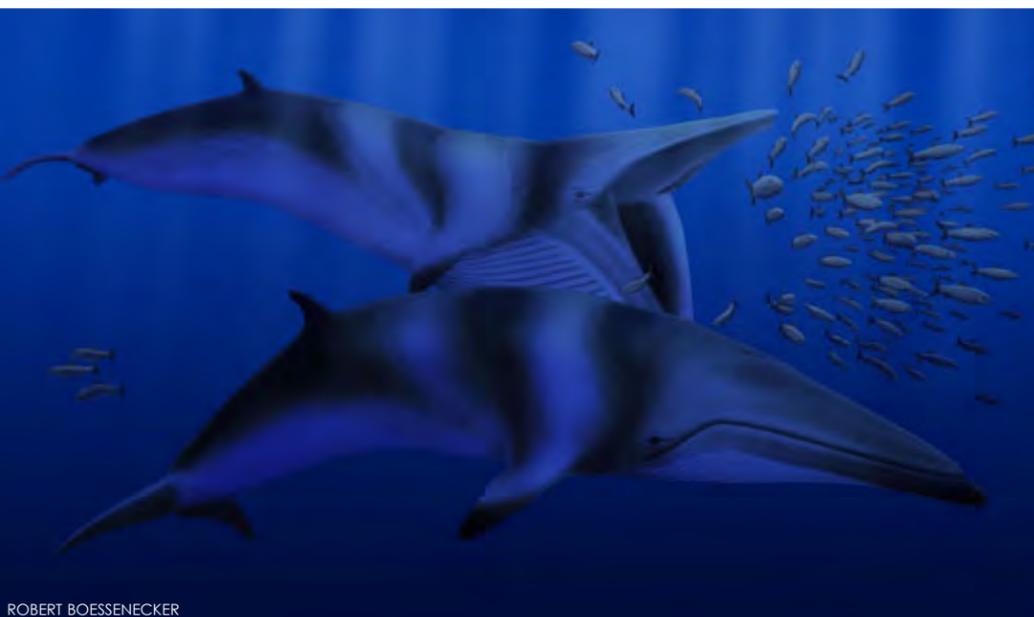
He excavated the incomplete skull of *Balaenoptera bertae* during early field research there in 2005, and it was encased in so much built up rock and earth that it took five years to remove.

"The mix of marine mammals I ended up uncovering was almost completely different to that found in the North Pacific today, and to anywhere else at that time," he said.

Primitive porpoises and baleen whales were living side-by-side with northern fur seal and right whales as well as beluga-like whales and tusked walruses, species far geographically removed from their modern relatives who now live in the Arctic.

Boessenecker said these species most likely began separating once the Bering Strait opened and the equatorial Pacific cooled during the Ice Age. "Modern marine mammals were able to migrate from other ocean basins into the North Pacific," he said, "leading to the mix we see today." ■

SOURCE: ROBERT W. BOESSENECKER



Artist's rendition of a pair of *Balaenoptera bertae*



Humpback whale breaching

## How whale poop makes breathing just a bit easier for humans

Before we get to the whale poop, a quick science review is in order—I apologize to any biology majors out there, but you're just going to have to bear with me for a moment.

Our science lesson begins with phytoplankton. Phytoplankton are microscopic plants that survive just like land plants, capturing sunlight and turning it into energy by the process of photosynthesis. In doing so, they actually consume carbon dioxide and release oxygen back into the atmosphere. In fact, phytoplankton are responsible for producing half of the planet's oxygen supply, so they are critically important to life on earth.

But sunshine alone isn't enough for the tiny little plants that make up the foundation for the entire aquatic food web (small marine life and fishes graze on the phy-

toplankton and those are then eaten by bigger and bigger predators), they need nutrients as well—and lots of it. The more nutrients an area of ocean has, the more phytoplankton grow. The more they grow, the more small fish populate the area. The more fish, the more sharks, rays, eels, dolphins and, you guessed it, whales.

This is where the poop comes in.

### The power of poo

Whales, as you can imagine, eat literally tons and tons of food and they release incredible amounts of excreta as well, which is filled with massive quantities of nutrients the phytoplankton need to survive. But the whales don't just "go wherever", they are much smarter than that.

Dr Joe Roman, a biologist at

Duke University explains the process. "The whales poop at the surface, increasing productivity of phytoplankton that use the nutrients in the feces. So you're going to get more fish and of course that's going to help the whales. So in a sense, they are fertilizing their own gardens."

The surface of the oceans receives far more sun than deeper waters, and by spreading their leavings across the surface, the whales are factually creating the perfect balance of light and food for the all important phytoplankton to thrive in. And the more these little plants eat and photosynthesize, the more oxygen they create for us humans to breathe.

So, the next time you're out at sea, breathing the fresh salty air, take a moment to thank the whales for being so smart—and so regular. ■



## Blue whales off New Zealand

Rare blue whales were spotted off the coast of New Zealand by scientists from the National Institute of Water and Atmospheric Research (NIWA). The researchers were on an expedition to study the blue whales in the South Taranaki Bight. The team observed almost 50 blue whales.

"It is very exciting to see these whales and start the process of collecting important data on this undescribed population and poorly understood foraging habitat," said marine ecologist and research team leader, Dr Leigh Torres. "In addition to finding the whales, we were able to detect their prey visually on the surface and at depth using hydro-acoustics."

The research team's goal is to collect important data to further current understanding of the blue whale population in the area. Recent studies have showed that there were more blue whales in the area than expected, probably linked to a major upwelling system which causes large clouds of plankton, upon which the blue whales feed. It was thought that the whales only passed through the area upon their migration to other feeding grounds.

"Blue whales need to eat vast amounts of plankton to support their energy demands. But there are just four confirmed blue whale foraging grounds in the Southern Hemisphere outside of Antarctic waters," said Torres. ■ SOURCE: NIWA

## Brazilian River Dolphin

**It is the first time in a nearly 100 years a new species of river dolphin has been discovered in the Araguaia River basin of Brazil.**

Scientists warn that it is highly endangered. Named after the Araguaia river where it was found, the species is only the fifth known of its kind in the world.

### Extinction looms

True river dolphins are some of the rarest and most endangered of all vertebrates. They comprise relict evolutionary lineages of high taxonomic distinctness and conservation value, but are afforded little protection. Three of the four other known species are listed as "threatened" by the International Union for Conservation of Nature (IUCN). One of the best known species, the Yangtze river dolphin or baiji, is believed

to have gone extinct in about 2006.

In the study, the Brazilian team concluded that the DNA of the Araguaian river dolphins is sufficiently different from that of other botos to warrant designation as a new species. The degree of difference suggests that the Araguaian boto most likely separated from other dolphin species more than two million years ago. Physical and genetic differences from other dolphins, they write, represent "strong evidence that individuals from the Araguaia River represent a distinct biological group."

The researchers propose that the new species be called the Araguaian Boto, or Boto-do-Araguaia. The scientists in Brazil observed about 120 of the Araguaian dolphins over 12 weeks. They estimate that there are about 1,000 of these creatures living in the river that flows northward for more than 2,600km to join the Amazon. ■

## New species of whale discovered

**With the re-discovery of *Mesoplodon hotaula*, there are now 22 recognised species of beaked whales.**

The discovery is based on the study of seven animals stranded on remote tropical islands in the Indian and Pacific Oceans over the past 50 years. The researchers used a combination of DNA analysis and physical characteristics to identify the new species from seven specimens found stranded in Sri Lanka, the Gilbert Islands (now Kiribati), Palmyra Atoll in the Northern Line Islands near Hawai'i, the Maldives, and the Seychelles.

The first specimen was a female found washed up on a Sri Lankan beach more than 50 years ago. At the time the National Museums of Ceylon, P.E.P (Paulus) Deraniyagala, described it as a new species, and

named it *Mesoplodon hotaula*, after the local Sinhala words for 'pointed beak'.

However, two years later, other researchers reclassified this specimen as an existing species, *Mesoplodon ginkgodens*, named for the tusk-like teeth of the adult males that are shaped like the leaves of a ginkgo tree.

"Now it turns out that Deraniyagala was right regarding the uniqueness of the whale he identified. While it is closely related to the ginkgo-toothed beaked whale, it is definitely not the same species," said international team leader, Dr Merel Dalebout, a visiting research fellow at UNSW. ■



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Marlies and Wolfgang Liebau, November 2013



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Text and photos by Pierre Constant

# Namibian Sinkholes

*Exploring the Magic Triangle*





Aigamas cave entrance



PREVIOUS PAGE: Tetsu at Guinas sinkhole, with three pumping stations

**Who could imagine for a minute that Namibia is a diving destination? Nobody. Despite its 2,000km of coastline, this is the mere truth. The marine temperatures are about 13°C on average, with an almost nil visibility resulting from stirred up waters and omnipresent sand. There is nevertheless a light of hope at the end of the tunnel. Some 30 years ago, caves and sinkholes were discovered, a peculiar reminder of the 'cenotes' in Mexico. In the old days of the German colony (1890-1915), the farmers of the north-east would draw water from these sinkholes, with electric pumps, for their cattle and in order to irrigate their farms. A hundred thousand years ago, San or Bushmen knew about their existence, too, for they gave names to these natural pits. Somehow, these inspired fear. The belief was that, whoever fell in would not come out alive!**

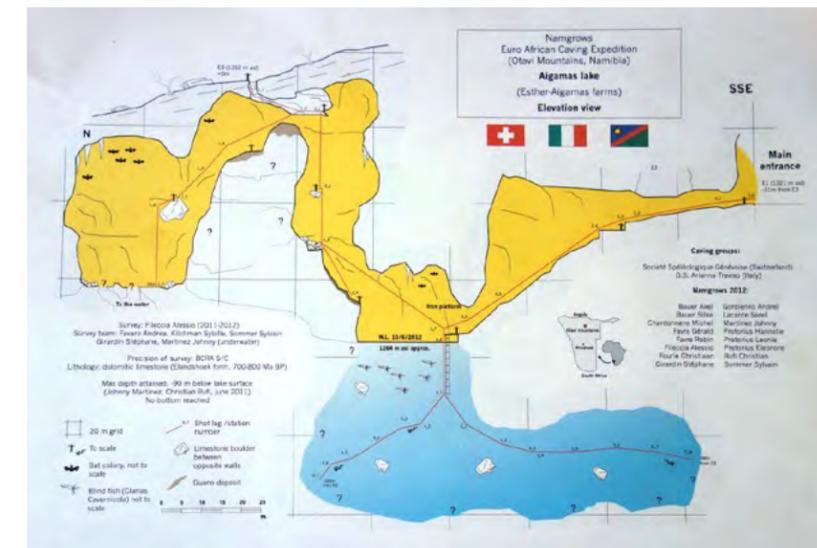
Originating in Antarctica, and born roughly five million years ago, the cold Benguella current flows from south to north along the Atlantic coast, creating a coastal desert. For sure, these waters are rich in fish and marine life, due to the upwelling of the Benguella current. Twenty species are currently harvested—hake, monkfish, sole, king-clip, snoek, but also horse mackerel (*Scomber japonicus*), pilchards, anchovies, skipjack tuna, albacora, spade-fish and pelagic sharks. Aquaculture is prolific, with a substantial production of oysters in Walvis Bay, Swakopmund and Luderitz (six million per year), abalone farms, mussels and agar agar in Luderitz, not to mention rock lobsters and deep water crabs. All in all, conditions that favour fishing, but which are resolutely a 'no no' for divers.

**Geology**

Once upon a time, the region was called Süd-West Afrika by the Germans. The actual territory of Namibia is a very old land, geologically speaking. Before the creation of Gondwanaland, some 540 million years ago, Earth was a huge ocean with some isolated 'cratons', which are commonly referred to as the original crust of the planet. Two thousand five hundred million years ago, southern Africa was made of two cratons: the Congo craton in the north

Axel's briefing before the dive; Survey map of Aigamas cave, by Alessio Fileccia (below)

**Namibia**



and the Kalahari craton in the south, both separated by a southwest-northeast extension of the ocean, known as Damara Sea.

Limestone like deposits were then generated. The Kalahari craton then collided with the Congo craton, with the subsequent subduction of the former under the latter.

Three hundred million years ago, Namibia was located near the South Pole and affected by tremendous glaciations. These ended 280 million years ago, when this part of the continent broke off from Antarctica.

The calcareous reef thus created in the Damara Sea 750 million years ago, were not made of coral—since it did not exist yet—but were secreted by cyanobacteria, better known as stromatolites. These encrusting algae are the oldest living forms on the planet (3,500 million years). Deposited over a period of 100 million years, these sediments formed layers of dolomite 5,000 metres thick. Mind blowing, right?

The intensive erosion that followed over the next 500 million years and during the humid phases of the Cretaceous and Tertiary, brought about the dissolution of the carbonates, a process known as karstification. Lime or dolomite, are eroded by an acid carbonic solution, related to rainfall.



Catfish swimming, displaying blue eyes (left); Carcass of bat underwater (above); Metallic stairway into Aigamas Cave (right); Tetsuaki in front of climbing ladder, neck deep in floating guano, Aigamas cave (lower left)



### The magic triangle

The "magic triangle" is found in the region of the Otavi Mountains, located between Tsumeb, Grootfontein and Otavi. At least 83 caves, chasms or sink-holes have been listed since 1974. A good number of those have been surveyed by Germans, South African, and Swiss speleologists since 1967 and even earlier.

Upon the occasion of one of my numerous trips to Namibia since 1992—being myself a cave diver since 2003—I decided eventually to find out about this. Accompanied by my Japanese client and friend Tetsuaki Masuda, we showed up at Aigamas farm one morning on 1 April 2013.

Cordially welcomed by Axel Bauer, a tall German farmer who could be straight out of the movie *Out of Africa*. We also met Chris and Steff, the fine team of technical divers from Namibia who will be responsible for logistics and security during our diving explorations.

### Aigamas sinkhole

*Aigamas* is a local name, which in Herero language means *big water*. We

drove up a mountain ridge of the farm with the 4x4 to get to it. The proper access did not look like much. The cave had a tent-like shape, pointed like a teepee, along a south-north fracture in dolomite limestone.

"It will be a 120 metres progression in the dark," said Axel referring to a sketched map before we ventured inside. We all had to sign a liability release as well.

The gradual slope was negotiated partly with a metallic stairway, then we made our way with some ropes on slippery boulders covered with debris, until we reached the platform. An iron grid overlooked the pool of water about 18 metres long. From here an iron ladder plunged 5m below, down to the water level.

"The exploration and a survey attempt was done by a Swiss-Italian team in 2011-12," said Axel.

Lead by Gerald Favre of the Swiss Société Spéléologique Genevoise, the survey map was done by Alessio Fileccia from Italy. The maximum depth of the dive was recorded at 93 metres, but the bottom was not reached. The fact is that Aigamas is a very narrow fracture

that plunges into a void.

### April fish

My quest today was stimulated by an encounter with the April fish (from the French saying, "Un poisson d'Avril") and that one is no joke! Fortunately we found it, for it is endemic to the site.

*Clarias cavernicola*, or giant cave catfish, is a very unique species. Mostly found at the surface of the water, where it feeds on the floating guano of bats, which falls from the roof of the cave. A priori blind, the fish is about 16 to 25cm long, sulphur yellow in colour, with two pin-like turquoise blue eyes. The rounded head has the shape of a bony helmet, pointed like an arrow behind the nape.

Eight conspicuous barbels are found around the mouth, which enable the

cave catfish to detect its food. It possesses a long dorsal fin, two small pectoral fins, two pelvic fins and a long anal fin that ends towards the tail, which is short and straight. Clear chevron markings are visible along the sides. The body is compressed, fusiform and eel-like. These characteristics are enhanced by the undulating movement of the catfish. Some specimens show an atrophy of the eyes, which become globulous and obviously useless.

The ancestor of *Clarias cavernicola* is most certainly from the Kunene or





CLOCKWISE FROM LEFT: Diver at the winch at 40m; Chris displaying the permit of National Heritage Council; Otjikoto dive platform and pumping station; Return to Otjikoto base after first dive; Tetsuaki inspecting the toilet bowls at 40m



cave man, covered in bat guano, to the delight of Steff who recorded the scene on his Go-Pro, as soon as I dropped the scuba tank.

### Otjikoto sinkhole

Some 20 minutes north of Tsumeb, is Otjikoto Lake—an historical site that depends on the National Heritage Council of Namibia, a government body which governs research and archeology. A diving permit is

the site was a trading post. Later on, the surrounding hills were guarded by armed men to prevent any exploitation of the copper ore, which was plentiful there.

Otjikoto was officially discovered in May 1851 by Charles Anderson and Francis Galton.

For the geologists, Otjikoto is a perfectly circular dolomitic sinkhole in the karst of the Damara Belt. Shaped like a calabash, the lake has a diameter of 102m and a surface of 7,075 sq m. As the depth at the centre has been estimated at 71m, the maximum depth on the sides went well beyond 145m, and to this day remains unknown.

“Come on, I’ll show you the dive plan!” shouted Chris with excitement, as we neared the edge of the cliff for a panoramic view. “The idea for the first dive is The Reef, an acclimatization dive

Okavango River further north, from the time when these rivers were flowing into the Etosha Pan (3 million years ago). Etosha was once a huge lake part of the Ovambo basin.

I sank down to a depth of 37 metres, in a crack that is hardly two metres wide. The water temperature was exquisite at 25°C. A number of bat corpses were found lying on the edges underwater, complete and apparently undisturbed by the catfish. It is said that the fish has also a cannibalistic behavior on the young individuals. I exited Aigamas as a true

compulsory. Delivered by the Namibia Underwater Federation, it is submitted for approval by the National Heritage Council, which controls all dive activities at Otjikoto. After Chris presented our permits to the authorities and we each paid the N\$25 entry fee, we were welcome to proceed.

Originating from the Otjiherero language, the name *Otjikoto* means, a *place too deep for cattle to drink*. The San called the site *Gaisis*, or *very ugly*, as it inspired fear in the bushmen.

Before the arrival of the first Europeans,



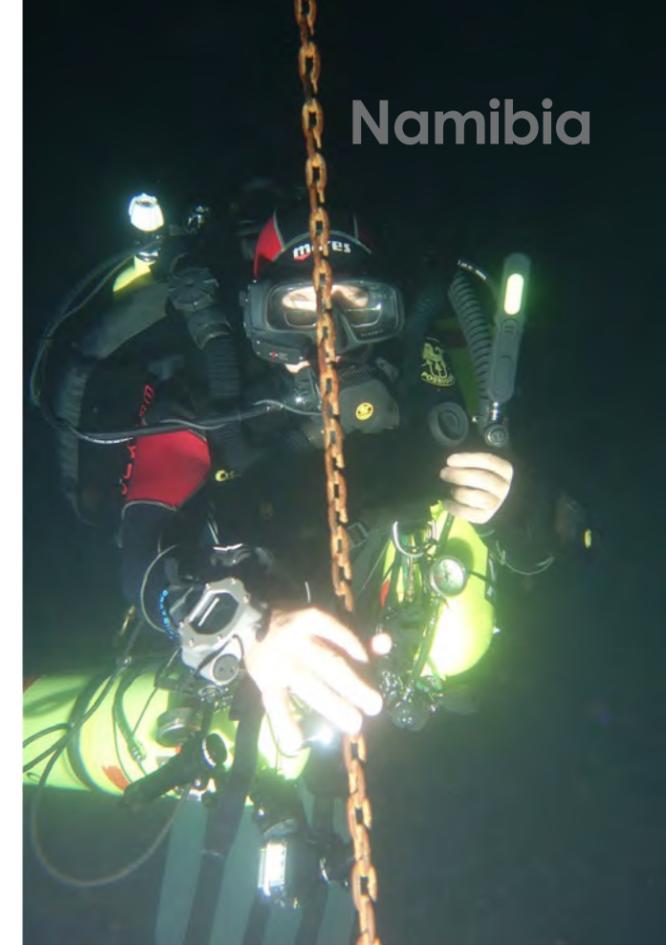
at 40m on the southern part of the sinkhole.”

Carrying the 15-liter steel tank, we accessed the water by a small

metallic stairway. “The level of the lake has never been so high, since the heavy rainfall of last year,” commented Steff. The level would normally have come up ten metres or so.

Finning on our backs, we crossed the lake from north to south. Hovering above





CLOCKWISE FROM LEFT: WWI German 3,7cm machine gun upside down at 57 metres in Otjikoto sinkhole; Chris and Tetsuaki at decompression stop; Chris coming up along the anchor chain in Otjikoto sinkhole; Shells in between the wheels of the machine gun; Shells and ammunition box



Kudu horns (an antelope).

From here, a line had been extended horizontally over the silty ridge, passing by various markers that had been ditched into the sinkhole—a bicycle wheel, a 40km speed limit signboard (reminder of the depth), an old rusted winch and finally a couple of toilet bowls, that shone like ivory jewels in the light beams.

The temperature of the water was very

acceptable at 20°C. The dive time was 41 minutes, with 15 minutes along the bottom. A safety stop of three minutes at six metres was followed by a four-minute stop at three meters and a 99 percent O<sub>2</sub> bottle was shared between Tetsuaki and myself—"To flush your excess nitrogen out!" warned Chris laughing. In fact, we

came out of the water with a delightful sensation of well being.

After a three-hour interval, the afternoon dive promised to be serious stuff. Twin tanks were used this time, with a mix of 19 percent oxygen and 30 percent helium.

During WWI, the Deutsche Schutztruppe of the German colony was attacked by the forces of the new Union of South Africa, fomented by the British crown. The army of the Reich was

pushed north as far as Tsumeb, where the Germans finally capitulated. To prevent their armaments from falling into the hands of the enemy, the German army dumped all their canons, ammunitions and guns, late June 1915 (Gunther Walbaum).

Since then, a number of these war relics have been salvaged in the 1960s and in the 1980s by intrepid recreational divers from Tsumeb. These items are on display today at the small Tsumeb Museum. It is a colourful history, which has left

its mark on Namibia forever, for even today the influence the German presence had is evident in the country.

### Night dive

A night dive to 57m was done over a highly volatile sedimentary bottom. Resting upside

down on the bottom was the so-called 'Cannon' and its two wooden wheels. Built by the company Friedrich Krupp in 1903, the 3.7cm automatic machine gun (POM-POM) shot projectiles of 1 pound (450grams), with a maximum range of 2,750 metres. A perfectly restored specimen can be admired at the Tsumeb Museum, as well as other pieces of artillery.

The Germans would have thrown away between 300 and 400 wagons of ammunition, 24 cannons and 85,725 Mausers. One of the wagons is now on display at the "Alte Feste" in Windhoek, the old German fort of 1890.

Suffice it to say that the stay at 57m depth was rather short, a fortiori when the visibility was soon disturbed by the presence of divers. Particles in the water was not conducive for flash photography, therefore I had to take pictures in ambient light, i.e. with a torch.

A few boxes of ammunition lay about, as well as a few live shells. The return to the surface required three deco stops at 9m, 6m and 3m, the latter two on pure oxygen. Despite it all, my Aladin comput-





Guinas sinkhole and entry ladder (above); Endemic *Tilapia guinasana* (left)

er was not satisfied with the treatment and added a 22-minute safety stop at 3m.

Steff helped me understand with his slate: "You are on oxygen, not air!" My computer was not adapted to these advanced gas mix calculations.

I came up to the surface to the great relief of Tetsu who reckoned that it was taking too long. However, my Aladin,

frustrated beyond words, started beeping madly and went into SOS mode for the next 24 hours, depriving me of my computer for the next day's dives. Tech diving is such another world.

"How about some 'Fire Water'?" suggested Steff with a laugh, to celebrate the event. After a polite refusal, Tetsu complied and ended up tipsy, as was expected!

### Guinas sinkhole

A bird's flight away in the direction of Etosha National Park, Guinas Lake is an elliptic sinkhole at 140m by 70m. To be politically correct, we pay a visit to the new owners, Nyck and Ludye of Cando Farming, producers of onions and potatoes, a farm of 700 hectares.

"The access to the sinkhole belongs today to three different partners, each one having his own pumping station,"

explained Chris. "In the old days, the best entry point was on the side of an angry farmer, who had the habit of shooting at any diver who attempted to cross his territory secretly," lamented Steff.

Twenty years have passed, and thank heaven, the angry bird is no more! "Before independence, Guinas was a food production farm for the South African army," added Nyck.

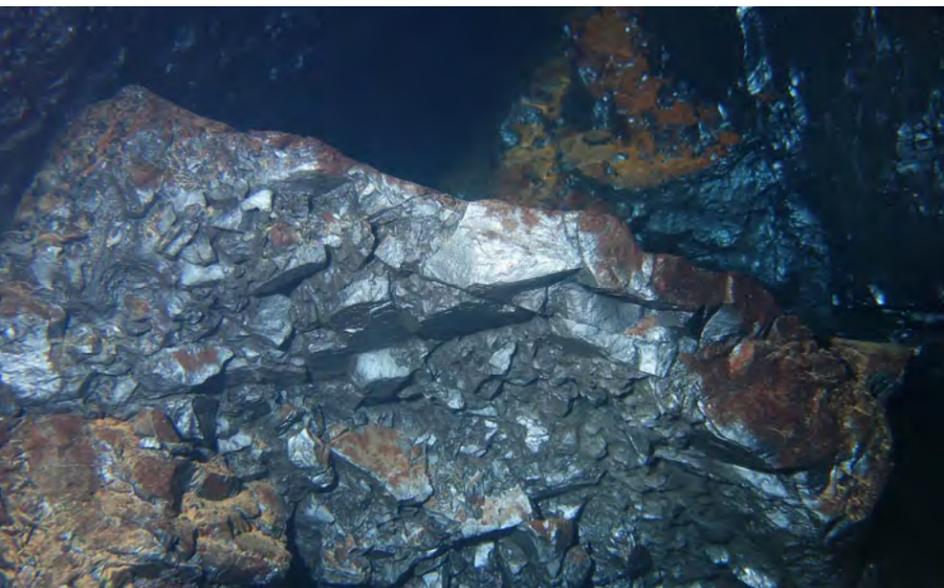
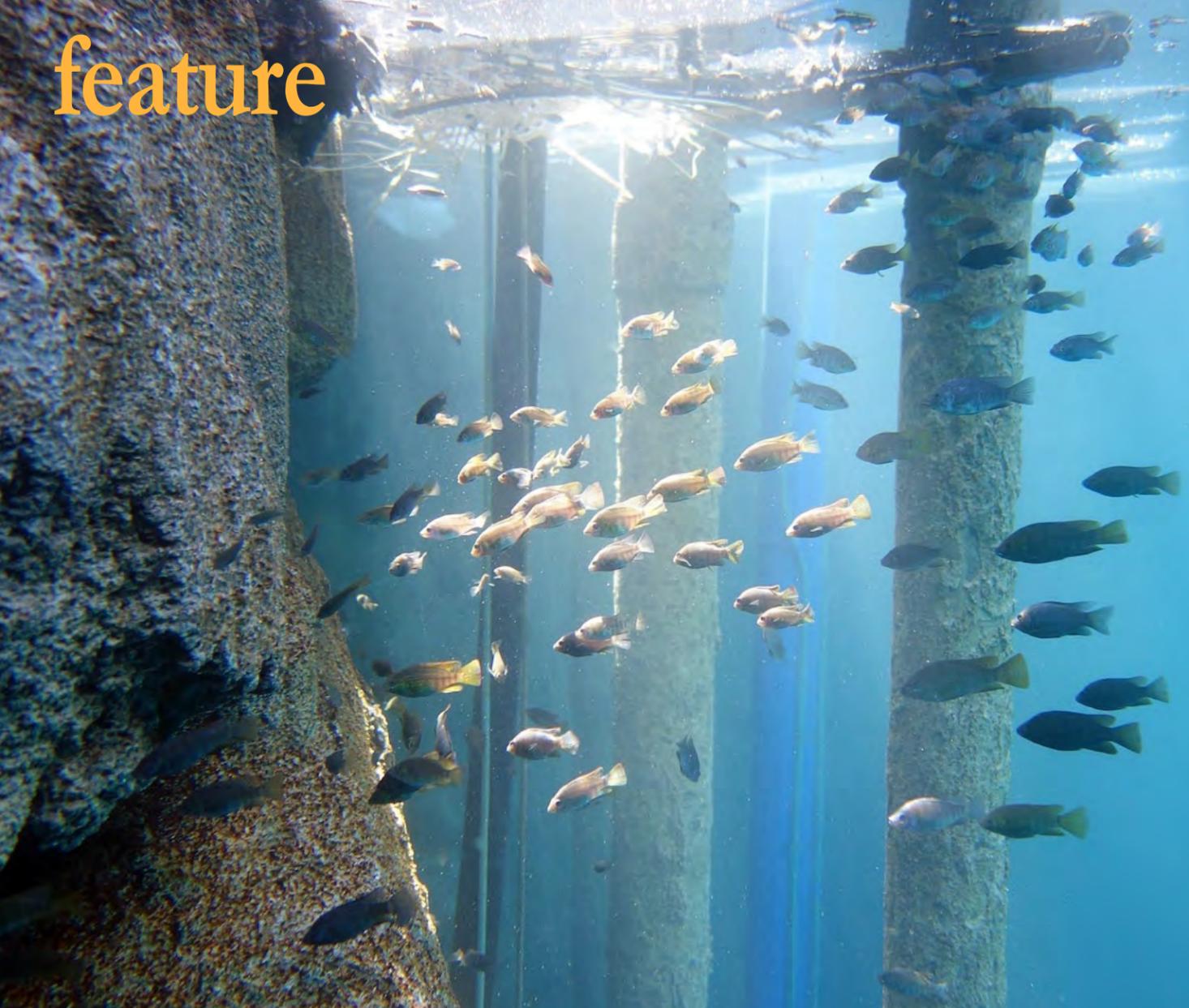
A striking difference to Otjikoto is the crystal clear appearance of Guinas Lake. The water has a cobalt blue colour and the visibility is optimal, an underwater photographer's dream come true.

We drive the 4x4 to the lower end of a rocky slope, near an old pump station in a landscape of aloe and spiny shrubs.

Chris had the 15-litre tanks ready with a 26 percent oxygen mix. Since the level of the lake was much higher this year, we could access the water with a rusty staircase, missing each and every step



Tetsuaki at the entrance of the underwater cave at Guinas sinkhole



Ore deposits (above) on the 'cooked' walls, Guinas; Endemic cichlid fish in school at Guinas (top left); Stalactites with ore deposits, Guinas (right)

## Namibia

Stalactites on roof of cavern, Guinas (left); Tetsuaki exploring cave entrance (below)



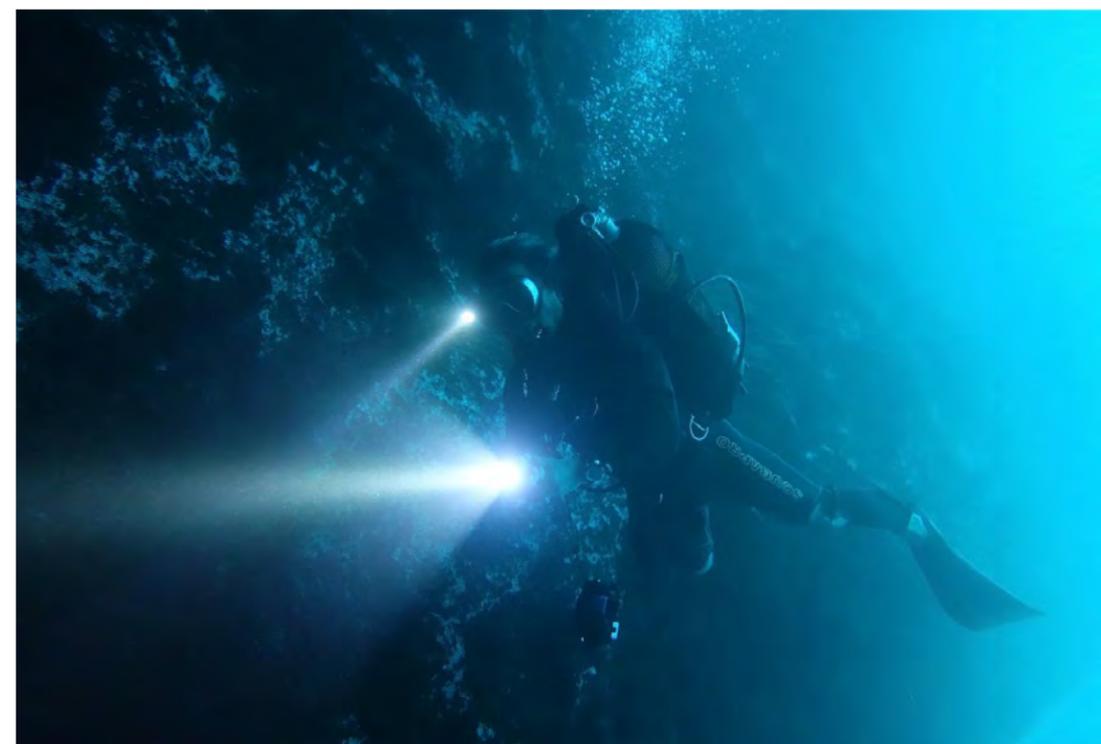
The second dive at Guinas with Tetsu was done clockwise, starting from a pipe on the north side. The cliff there was carved into a vast cavern where I observed some stalactites on the roof—proof that the cave was out of the water for some time. A proper tunnel disappeared underground at 40 metres, clearly too deep for a sensible cave diver.

An endemic species of Cichlidae fish was discovered here—*Tilapia guinasana*, which is about 10cm long, with colour variations from white to almond green, yellowish, brown, grey to black. The fish move about in small groups, close to the surface waters.

### Diving Guinas

The entrance of a cave caught my attention at 31 metres. A slope of sediments came down to 40m into the darkness. A line extending across a passage underground told me that prior explorations had taken place there.

To my astonishment, I gazed upon a long bone lying on the cave floor—perhaps an oryx? Then I fell upon the upside down blackened skull of an old warthog. At



for convenience.

Chris and Steff decided to dive with their rebreathers and gave us a free ticket to have our own dive the way we pleased.

I chose to have it counter clockwise at first. Impressive, the walls of the sinkhole dropped vertically into the abyss. From hearsay, the maximum depth—up to 120m—was still beyond human reach.

Carved into dolomite 700 million years ago, the typical karst environment of Guinas reveals the spreading of various caves underground. According to geologists, Guinas would be the 12th largest cave in the world, something to make you wonder.



once, I recognized the widening of the nostrils towards the end of the head (or muzzle). They were very ancient bones that I refrained to collect. A couple of photos should satisfy my curiosity.

The tunnel continued at depth, blowing away any illusions I may have had of venturing in myself. The curiosity killed the cat.

To my bewilderment, from the beginning of the dive, the walls of the cavern were covered with a metallic dark silver sheen that reminded me of galena (PbS or lead sulfur). A thought sprung up in my mind that the walls had a conspicuous 'cooked aspect'.

Recollecting my university background in geology and considering that the temperature of the water in Guinas was abnormally high at 27°C, I came to the conclusion that the sinkhole was an active hydro-



Dolomitic landscape at Dragon's Breath Hole; Horseshoe-nosed bats inside cave (left)

remains uncertain to this day. A visit to the Geological Survey Museum in Windhoek confirmed the occurrence of galena in the region of Tsumeb, already famous for its copper mines, zinc, lead, silver, nickel and other minerals exploited by the Germans.

As the day faded to an incandescent sunset, the bush seemed on fire.

"Time for 'Fire Water!'" joked Steff, who had not lost his sense of humour. He handed a drink to Tetsu who could not refuse.

"Oh no, I will be drunk again!" he moaned and laughed at the same time. We returned joyfully to Tsumeb after dark. Tonight was our farewell dinner at the Drus campsite restaurant.

**Otavi**

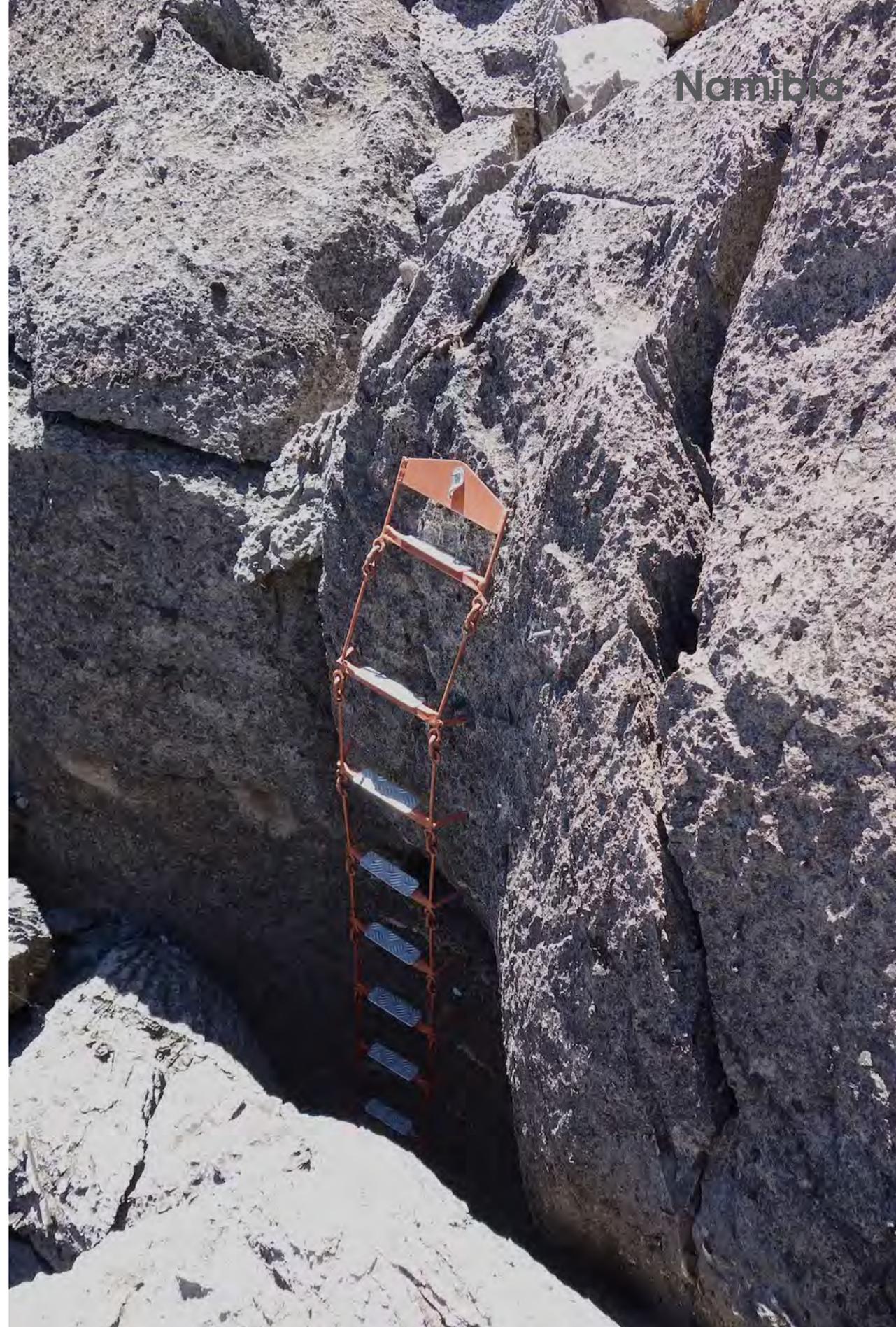
The Otavi Mountains form parallel ridges

extending east to west. This mountain range is a mine of karstic treasures, and some like Ghaub Cave, have been classified as national monuments.

At 1,643m above sea level, Harasib Chasm on top of a limestone ridge is truly impressive. A vertical pit of more than a 100m, which is only accessible to highly skilled speleologists. In June 2012, Gerald Favre and his team led an exploratory mission with a technical dive to a depth of 147m underwater—still bottomless.

Not far from here, another marvel of nature is hiding in the darkness of Dragon's Breath Hole. The dolomite karst is a reminder of the erosion of the Tsingy in Madagascar, carved like Swiss cheese, with very sharp stone needles.

Back in 1986, the cavers of the South African Speleological Association (SASA), discovered a gigantic underground lake of 19,000 sq m (i.e. 200m by 145m).

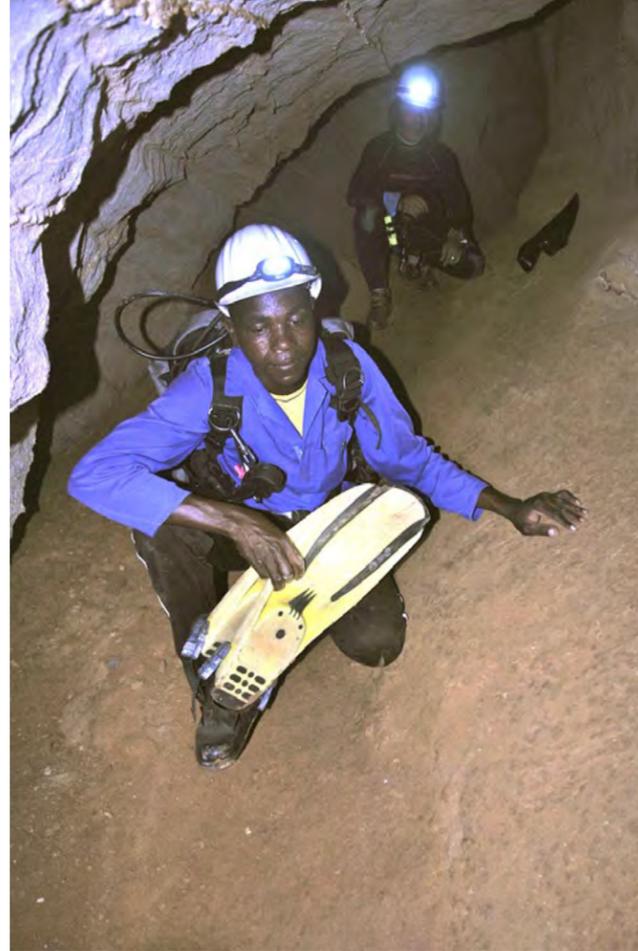


Ladder climbing down into Dragon's Breath entrance

thermal vent, related to some ancient volcanic activity.

The magmatic process combined with the Damara orogenesis 550 to 580 million years ago—a mountain building event—bringing ore deposits from a solution of hot water, the source of which





The striking deep pit of Harasib; Andreas' assistant and Tetsu creeping inside Ghaub cave with dive gear; Overview of the chasm, Harasib

Appearances are misleading for the entry hole is a chimney only one metre in diameter!

We climbed down five metres underground with a red metallic ladder. A colony of tiny horseshoe-nosed bats welcomed us under a ledge. A horizontal progression of ten metres led us to a crack and a dead end. "From here, it is a 120m vertical drop, abseiling (rappelling) to the level of the lake," confirmed Chris with a smile.

Following the departure of Chris and Steff, our last exploration was done at Ghaub Cave, a national monument on the top of a ridge. Ghaub Guestfarm leads guided tours inside the cavern.

"We'll have to make our way for about 100 metres underground before we get to the water," said Andreas, the guide. Of course, we had to carry the tanks and the dive gear, with a helmet and a head lamp through a maze of narrow corridors and boulders, which we needed to climb up and down.

"It can be a bloody affair," I was told. To make things easier, I donned a 5mm wetsuit and a 15-liter tank on my back; plus, I carried a camera and a mesh bag in my hands.

The sustained effort made me sweat profusely. I was literally overheating. My heart beat like a drum. I suddenly gasped for air and realized that I could not breathe. I felt like I was very close to having a heart attack; my survival system was on high alert with a red light blinking.

So, when our guide Andreas pointed out to the waterhole some 2.5m down an almost vertical narrow pit, I was in shock. If we ever made it down to the bottom, it would be impossible to come out of the water. We would be drowned like rats.

"We won't make it—it's too risky!" I puffed, as I glanced sideways to a dumbfounded Tetsu. While the water was gin clear and appealing, I decided to call it off. We turned around, to the

great relief of Tetsu, who did not really feel like going for it either. A wise decision indeed.

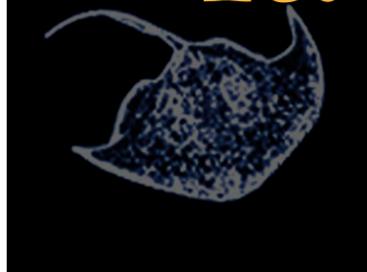
### Afterthoughts

The return to the outside world was a painful affair. The tank was heavier to carry. The fresh air of the surface brought me back to life, though. "In extremis," I thought to myself.

This chapter in our exploration of Namibian caves and sinkholes was closed for now. Back at Ghaub Guestfarm, we recovered from our emotional adventure. A dip in the cool waters of the swimming pool and a cold beer on the lawn did the trick and brought smiles back to our faces. ■

*Pierre Constant has been leading trips to Namibia for over 20 years. He will organize a dive trip there in April and October 2014. For more information, email [calaolife@yahoo.com](mailto:calaolife@yahoo.com) or visit [www.calaolife.com](http://www.calaolife.com).*

# fact file



## Namibia



SOURCES: U.S. CIA WORLD FACTBOOK, XE.COM, MIDLANDSDIVINGCHAMBER.CO.UK

**History** In 1884, the Germans established a colony in South-West Africa in the region that is now called Namibia. During WWI, South Africa occupied the colony and managed it as mandated by the League of Nations (precursor of the United Nations) until after WWII. South Africa then annexed the territory. In 1966 the guerrilla group called the Marxist South-West Africa People's Organization (SWAPO) initiated a war of independence for the region that is now Namibia. A U.N. peace plan for the entire region finally spurred South Africa to agree to end its administration in 1988. Since the country won independence in 1990, SWAPO has governed Namibia. President Sam Nujoma led the country during its first 14 years of self rule, until 2004, when Hifikepunye Pohamba became president after a landslide victory. He was reelected to office in 2009. Government: Republic. Capital: Windhoek

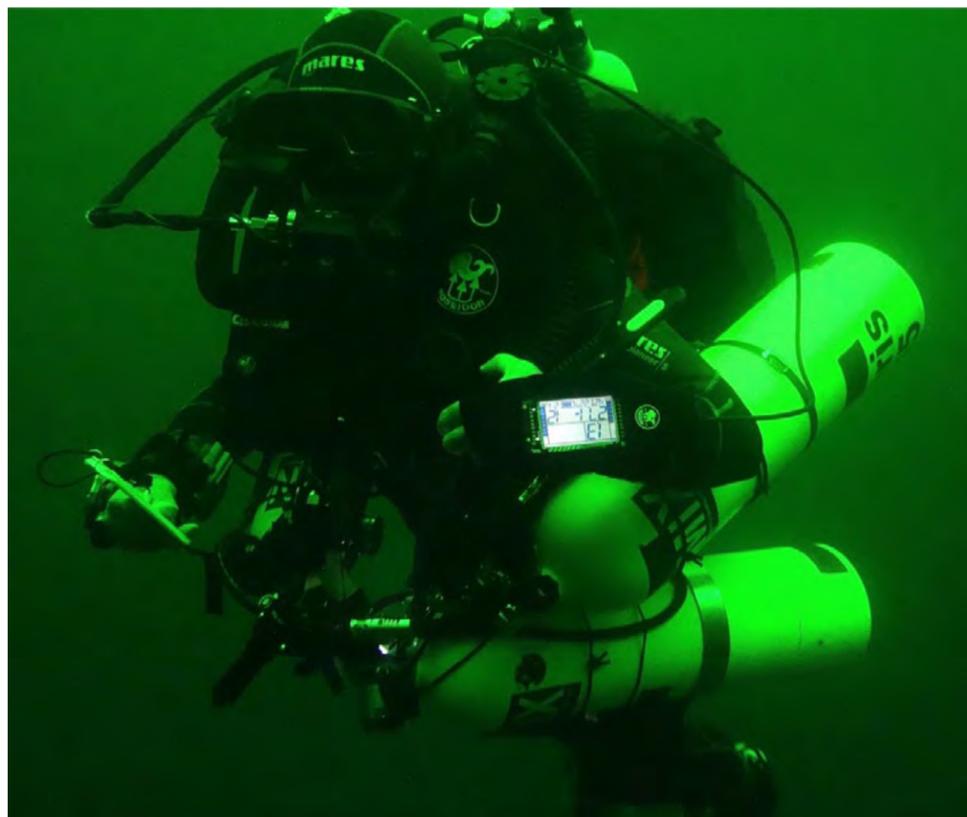
**Geography** Namibia is located in Southern Africa. It borders the South Atlantic Ocean, between South Africa and Angola. Terrain is primarily high plateau with the Kalahari Desert in the east and the Namib Desert along the coast. Coastline: 1,572km. Lowest point: Atlantic Ocean 0m. Highest point: Konigstein 2,606m.

**Climate** Namibia has a hot, dry desert climate with occasional, sporadic rainfall. Natural hazards: lengthy periods of drought.

**Environmental issues** Challenges include limited resources of natural freshwater, desertification, poaching of wildlife, degradation of land leading to few areas of conservation.

**Economy** Namibia's economy is heavily dependent on mining. The region is also rich in diamonds. In addition, marine

diamond mining is gaining importance as the supply of terrestrials diamonds is disappearing. The country is a major producer of uranium, the world's fourth-largest, as well as large amounts of zinc and smaller quantities of gold and other minerals. Three percent of the population is employed by the mining sector. Food shortages are a big problem in rural areas during drought years, leading to the necessity of importing half of the country's cereal needs. There is a wide discrepancy in income



RIGHT: Location of Namibia on global map. BELOW: Map of Namibia. LOWER LEFT: Chris on The Reef in full gear, Ojikoto sinkhole



**Population** 2,182,852 (July 2013 est.) Ethnic groups: black 87.5%, white 6%, mixed 6.5%. Around 50% of the population are members of the Ovambo tribe and 9% belong to the Kavangos tribe; additional ethnic groups include Herero 7%, Damara 7%, Nama 5%, Caprivian 4%, Bushmen 3%, Baster 2%, Tswana 0.5%.



distribution, despite a high per capita GDP relative to the region. The Namibian dollar is linked to the South African rand, as 30%-40% of Namibia's revenues comes from the Southern African Customs Union (SACU). Volatility in the price of uranium affects the country's economy, while profit margins have decreased with the rising cost of mining diamonds, particularly in the ocean. The government is responding by emphasizing the need to increase manufacturing, higher value raw materials and services, such as logistics and transportation.

**Currency** Namibian dollars (NAD). Exchange rates: 1EUR=15.17NAD, 1USD=11.13NAD, 1GBP=18.25NAD, 1AUD=9.94NAD, 1SGD=8.79NAD

Religions: Christian 80%-90% (half are Lutheran); indigenous beliefs 10%-20%. Internet users: 127,500 (2009)

**Language** English is the official language spoken by 7%, but Afrikaans is the common language of most citizens and around 60% of the white population; 32% speak German; and 1% speak indigenous languages

including Oshivambo, Herero and Nama

### Decompression chamber

Erongo Primary Health Services Limited  
Welwitschia Hospital  
Walvis Bay  
tel. +264 (0)64-218-914

### Travel/Visa

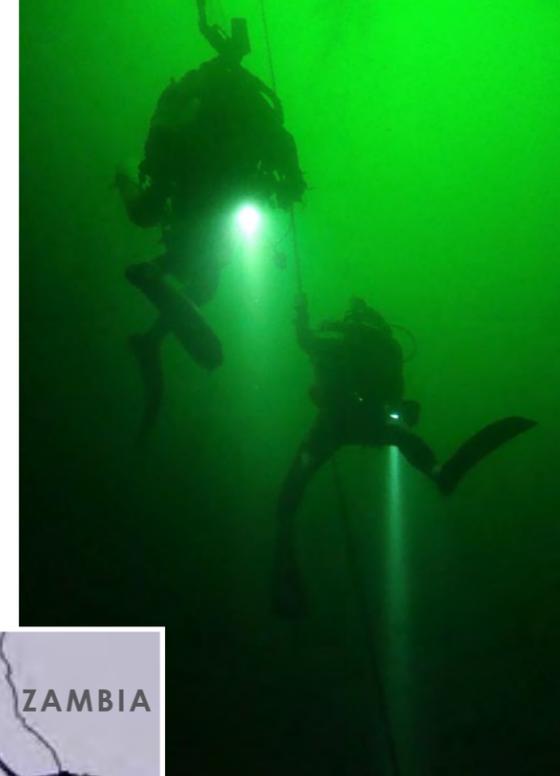
For tourist trips under three months, a visa is not required for visiting tourists from most countries. See your local embassy for more information.

### Health

There is a high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A, and typhoid fever; and vector-borne disease such as malaria; as well as water contact disease such as schistosomiasis (2013)

### Websites

Namibia Tourism  
[www.namibiatourism.com.na](http://www.namibiatourism.com.na)



# turtle tales



Edited by  
Bonnie McKenna

Leatherback  
sea turtle



B KIMMEL / WIKIPEDIA COMMONS

## Pigments from fossils hold key to colors of ancient sea creatures

For the first time, a team of international scientists have found out the colors of extinct marine animals, the predecessors of today's leatherback turtle, by using fossilised skin pigment from marine reptiles millions of years old.

Prior to this study published in the journal *Nature*, researchers could only guess what the colors of huge reptiles, such as the ichthyosaurs and mosasaurs, were. Now analysis of preserved fossilised skin at the SP Technical Research Institute of Sweden and MAX IV Laboratory at Lund University in Sweden have revealed the dark color of a 55 million-year-old leatherback turtle as well as mosasaur 85 million years of age and an ichthyosaur 190 million years of age.

"The most sensational aspect of the investigation is that it can now be established that these ancient marine reptiles were, at least partially, dark-coloured in life, something that probably

contributed to more efficient thermoregulation, as well as providing means for camouflage and protection against harmful UV radiation," said study researcher and senior lecturer in vertebrate paleontology Dr Gareth Dyke of the University of Southampton.

In the study, researchers from Denmark, Sweden, England and the USA analysed dark skin patches of fossils containing a vast amount of oblate bodies a micrometer in size. Previously thought to be the fossilised remains of bacteria contributing to the decomposition process, scientists now know they are in fact remains of the creature's own skin color, the pigment of which is found in these small micrometer bodies.

"Our results really are amazing. The pigment melanin is almost unbelievably stable. Our discovery enables us to make a journey through time and to revisit these ancient reptiles using their own

biomolecules," said co-author of the study Per Uvdal who works at the MAX IV Laboratory. "Now, we can finally use sophisticated molecular and imaging techniques to learn what these animals looked like and how they lived."

Aside from assisting in camouflage, the dark color of the pigment of the skin helped ancient leatherback sea turtles get warmer faster at the surface of the sea, especially in colder climates. "The fossil leatherback turtle probably had a similar colour scheme and lifestyle as does *Dermochelys*. Similarly, mosasaurs and ichthyosaurs, which also had worldwide distributions, may have used their darkly coloured skin to heat up quickly between dives," said lead researcher of the study Johan Lindgren from Lund University in Sweden. ■ SOURCE: UNIVERSITY OF SOUTHAMPTON

## Leatherback turtle by-catch hotspots identified in new study

Researchers tracked 135 tagged sea turtles to find areas of high contact with fishing vessels in the Pacific Ocean. Satellite data collected could help decrease the amount of endangered turtles killed as by-catch.

The study published in the journal *Proceedings of the Royal Society B* collated data from a number of projects from 1992 to 2008.

"To really get an idea about

where the leatherbacks go, you have got to have turtles tagged from multiple locations," said lead author Dr John Roe from the University of North Carolina's Pembroke campus. "So it took getting just about everyone who has put a satellite tag on a leatherback for other research purposes to collaborate to get a sample size large enough to allow us to answer that question."

Researchers wanted to find out where turtle populations and fishing vessels were most likely to come into contact in the Pacific. They found that areas of potential risk include a corridor between Costa Rica and the Galapagos, as well as the waters off the nesting beaches in north-west New Guinea.

"We used that data to over-

lay with the data of the areas the turtles were using in order to figure out where the turtle hotspots matched with the fisheries hotspots to identify the areas where by-catch was most likely to occur," said Roe.

While the analysis of the study was the largest compilation of data of its kind, scientists say more tagging data is needed to get a better, more detailed picture of the problem.

"We need to target these areas to see if the turtle persistently use these areas over and over again," Roe said. "That would provide really useful information in the management of by-catch because the fisheries authorities would have that knowledge and adjust their fishing efforts accordingly." ■ SOURCE: BBC

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Ann Donahue, October 2013



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