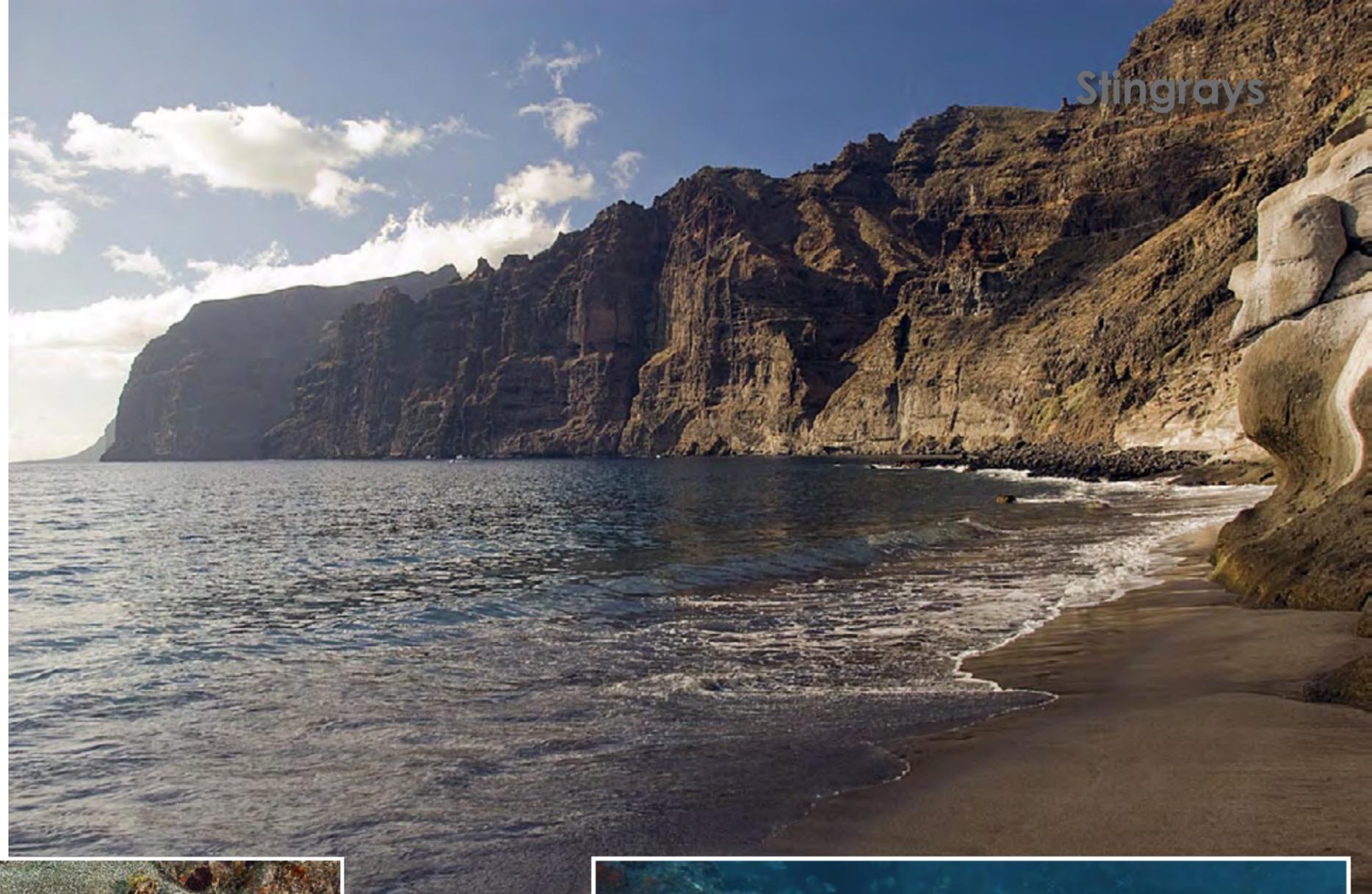




Winged Wonders of the Canary Islands

Stingrays

Text and photos by Andy Murch

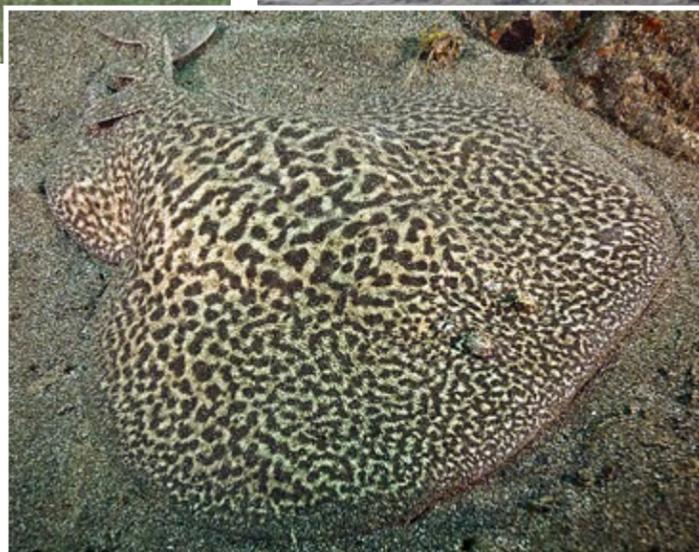


CLOCKWISE: A Marbled torpedo ray threatening to shock; The dramatic walls of Los Gigantes; Roughtail stingrays looking for scraps. A camouflaged; torpedo ray. PREVIOUS PAGE: Common stingray takes flight

Los Gigantes is a small fishing community on the west side of Tenerife in the Canary Islands. It is named for the enormous cliffs that dominate the shoreline to the north of the village, but the name is equally appropriate for the gigantic rays that frequent the area.

Twenty meters below the surface, the looming walls of volcanic rock terminate among boulders the size of holiday condos. Deeper still, the coral encrusted blocks give way to a featureless, lunar landscape of sparkling, slate gray sand.

At first sight, the aquatic desert appears to be devoid of life, but appearances can be deceiving. Under thin veils of sand, scores of subtly camou-



flaged rays and cryptically colored angel sharks lay dormant, waiting for divers to arrive with their tasty treats.

Rays started congregating here in 1996, when the owner of Los Gigantes Dive Centre had the bright idea of starting an organized stingray feed to attract more divers

to the area. The rays responded with as much enthusiasm as the paying guests, and before long, enough animals had overcome



A diver enjoys a close encounter with a fearless common stingray; Common stingrays playing tag (below)

their natural fear of bubble blowers for the feed to be pitched as a “guaranteed encounter”.

Unlike the ray experience at Stingray City in the Cayman Islands, the feed at Los Gigantes attracts many different species of rays including a few gargantuan rough-tail stingrays that probably weigh upwards of 300lbs. The most abundant species in attendance are usually common and round stingrays, both of which can be seen circling the anchor chain as soon as the dive boat arrives. Other regular participants are common eagle rays that soar back and forth scooping up fish scraps as they drift



away from the chum barrel.

The feed itself is a seemingly haphazard affair. The feeder carries a large barrel filled with carcasses that have been donated by local seafood restaurants. Upon touchdown at 25m, he is immediately mobbed by ill-behaved rays of all shapes and sizes that employ a variety of meth-

ods to get at the scraps.

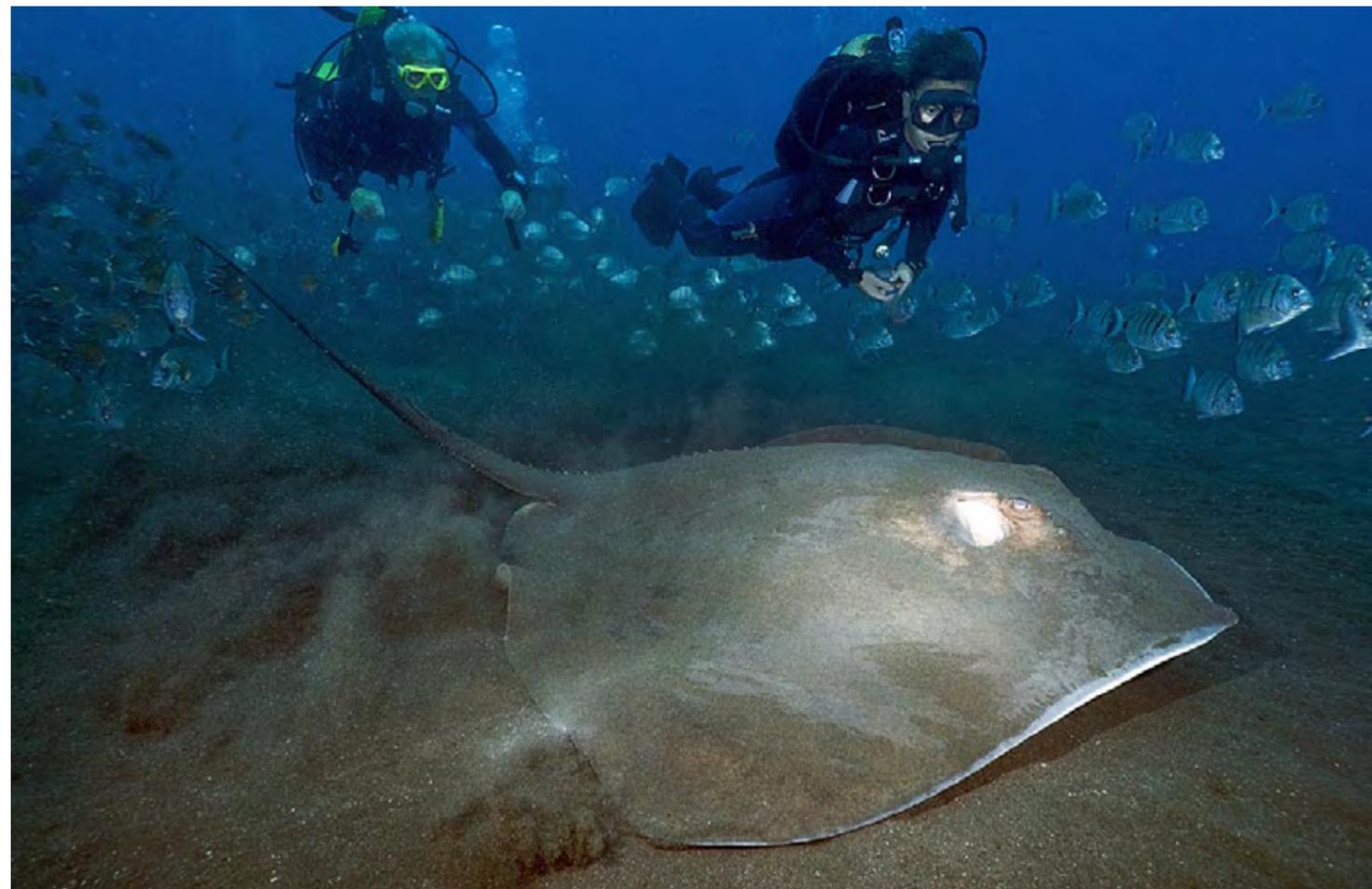
Some of the smaller rays try to work their entire bodies into the bait barrel, while their larger cousins use their bulk in an attempt to separate the barrel completely from the feeder's grasp. The ensuing battle of wits is an entertaining spectacle that can last for a good ten minutes

or more. Once the rays settle down, the feeder offers a handful of fish to any divers that want to play one-on-one with the rays, at which point the encounter fragments into a series of smaller tussles.

At the end of the dive, any scraps that are left in the barrel are unceremoniously dumped in



CLOCKWISE: Volcanic cliffs tower above the stingray feeding site; A gigantic two-meter wide rough-tail stingray; A (not so) common angel shark



Stingrays

explode from the seafloor faster than the hapless fish can register, then meld back into the sand again until another meal passes by.

Sadly, common angel sharks (*Squatina squatina*) are now anything but common. Their range once extended along the continental shelves of Europe and North Africa all the way from Norway to Mauritania including the Mediterranean and Black Seas.

Although there has never been a

a heap on the sand. The rays, which are obviously used to this eventuality, immediately bombard the pile of succulent fish carcasses from all directions until every last morsel has been consumed.

Once the feed degenerates into a free-for-all, the visibility generally plummets as well. Course grains of sand explode skyward covering rays, divers and cameras alike. Consequently, photographers wishing to capture good shots of the action should plan to get the majority of their images early on in the dive.

As chaotic as this encounter sounds, no one has ever been stung by a ray at Los Gigantes. However, there are also many marbled torpedo rays that frequent the area, and quite a few people have been shocked by dropping onto the sand directly over an angry, buried torpedo. Although torpedo rays can emit a painful electrical punch, the jolts have no lasting physical effect. If they have the chance they will also warn divers by lifting off the sand and arching their backs. If you see this odd behavior, try to quickly back away.

Sharks

Rays may abound at Los Gigantes, but shark encounters are few and far between. Although there are not many reef sharks, the area is home to a healthy population of common angel sharks that occasionally venture into the fray.

Between organized feeds, they can sometimes be found lurking under the sand in the immediate vicinity.

Angel sharks are flattened ambush predators that lay motionless on the substrate waiting for small fishes to swim close to their mouths. Once a suitable victim strays within striking distance, they

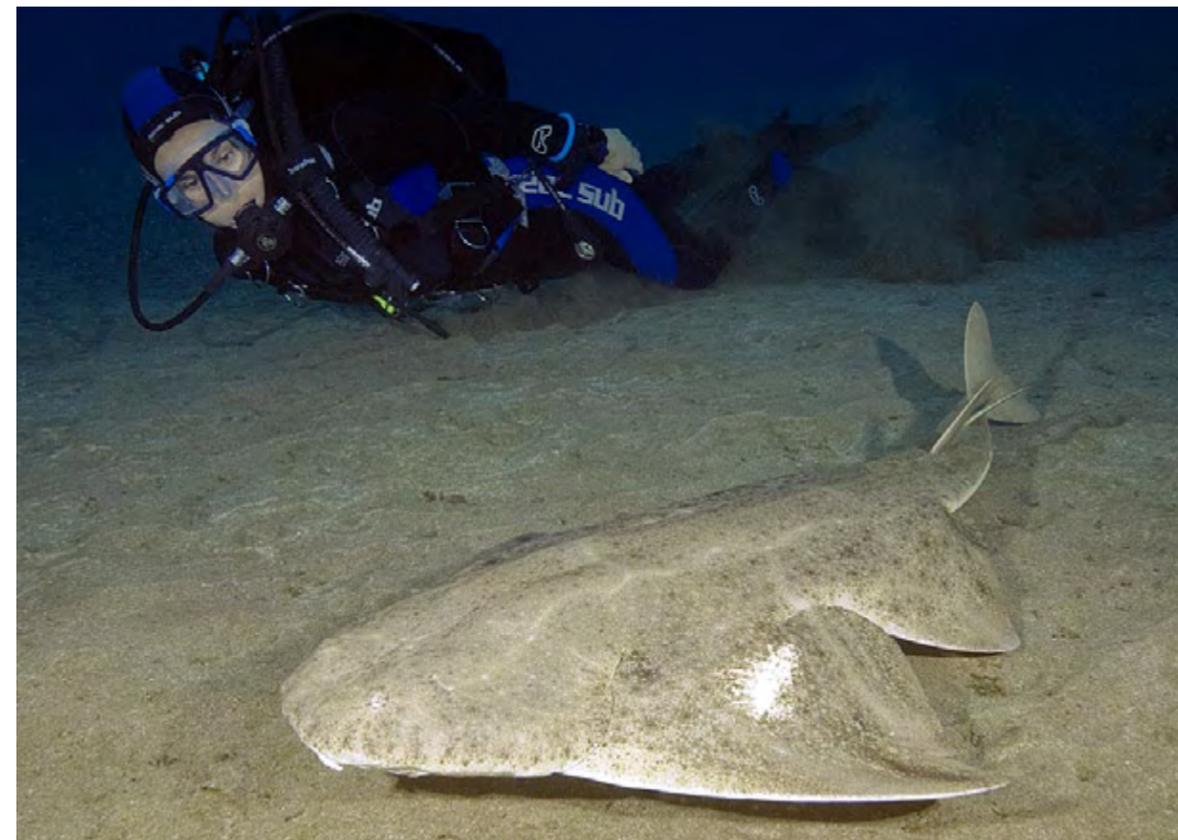
large targeted fishery for common angel sharks, their sedate, bottom dwelling nature leaves them extremely vulnerable to accidental capture in bottom trawl fisheries. Except for the healthy population around the Canaries, common angel sharks are now rarely encountered.





Stingrays

CLOCKWISE FROM TOP LEFT: An exquisitely patterned spiny butterfly ray; A lucky diver shadows an angel shark; Angel sharks are now commercially extinct in the North Sea; Spiny butterfly ray is well-camouflaged to blend in with the texture of the sandy sea floor



exquisitely patterned pectoral fins is an experience not soon forgotten.

Although the demand is great, the dive centre purposely limits the feeds to one per week in order to stop the animals becoming reliant on scraps. Fortunately, the area has a lot more to offer divers. Octos, morays and a myriad of fishes inhabit every nook and cranny, but the rays of Los Gigantes remain the star attraction. ■

In fact, they are considered to be locally extinct in much of the North Sea.

Other random elasmobranchs that occasionally stop by include large bull rays and (very rarely) a distantly passing hammerhead or two.

Perhaps the most beautiful visitors are the spiny butterfly rays, which take on the appearance of flying Persian carpets when they alight from their sandy hiding places and glide miraculously over the seafloor. Following a graceful butterfly ray as it wafts along slowly undulating its



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Edited by Peter Symes

Sharks and rays queue up for a fin-icure and gill floss

North Queensland researchers say they are amazed by new images of sharks and manta rays lining up to be cleaned by smaller fish on the Great Barrier Reef.

James Cook University researchers set up cameras on the reef and captured images of sharks and manta rays visiting so-called 'cleaning stations'.

"The objective of the study was to document the occurrence and frequency of visits by manta rays and sharks to cleaning stations in the northern Great Barrier Reef and at Osprey Reef in the Coral Sea," one of the researchers, Professor Michael Kingsford, said.

He said manta rays would show up at the cleaning stations and would hold completely still while the smaller fish went to work, often for several

hours at a time.

"The manta rays would cease all movement of their fins while in the cleaning stations," he said. "Their gills were often flared and mouths open but never wide enough to suggest feeding. Several cleaner fish would then migrate upwards towards the animal and begin cleaning."

Sharks were also keen for a clean, holding themselves in a vertical position while the smaller fish worked, or swimming over cleaning sites to receive attention.

Kingsford said that shark posturing was far more elaborate and included becoming

almost vertical in most cleaning engagements. At other times, sharks would casually swim over the site and receive attention from cleaners.

"Sharks in the 'vertical posture' would typically approach with the tide before pointing head upward towards the surface upon reaching the cleaning station," the researchers wrote.

"Pectoral fins pointed down, mouth open, gills flared and a rapid paddling of the caudal fin were typical behaviours.

"Depending on the strength of the current, each interaction would last anywhere between five and ten seconds before the client would move away from the station and the cleaners would immediately retreat to the reef.

"The shark clients—in most cases—would swim back around into the current and repeat the process until cleaning had ceased."

Kingsford said large numbers of sharks gathered in the cleaning stations although not all were actively engaged in cleaning interactions.

"During the sessions captured by our cameras more than 1100 sharks were observed at Osprey Reef but no feeding or chasing was observed in any of the sightings," he said. ■



A shark that glows

The velvet belly lantern shark emits a blue luminescence from thousands of tiny photophores

Contrary to self-luminescent bony fishes, which harbour a nervous control mechanism of their photophore luminescence, the light emission is under hormonal control in the cartilaginous *E. spinax*. This clearly highlights the diversity of fish luminescence and confirms its multiple independent apparitions during the course of evolution. In all animals investigated up to this point, luminescence is triggered by nerve cells. Finding a parallel pathway to bioluminescence—one that's controlled by

hormones, not nerves—strongly supports the notion that light-emitting powers have evolved multiple times in animals.

The light-emitting cells in some sharks aren't connected to prominent nerve cells, and the slow onset of their glow hinted that something other than nerves were involved. Exposing patches of skin from lantern sharks to hormones and to nerve signaling molecules confirmed that hormones turn on the sharks' bluish glow.

Melatonin, which in humans is

an important hormone for sleep regulation, induced a slow, long-lasting glow in the skin patches that persisted for several hours, researchers show. This light probably serves to camouflage these velvet belly lantern sharks, *Etmopterus spinax*, counter-illuminating them from below as they descend to darker depths of the sea, said Julien Claes, co-author of the study with Jérôme Mallefet of the Catholic University of Louvain in Belgium. ■



Remoras cling on to a nurse shark

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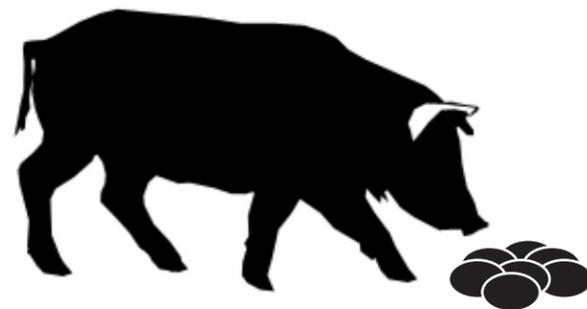
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Edited by
Bonnie McKenna



Turtle sniffing dogs

Text by Bonnie McKenna
Photos courtesy of
Dr Donna Shaver

Dogs can do amazing things. One of the most unusual amazing fetes is to sniff out turtle nests; specifically Kemp's ridley turtle nests.

Chief among the jobs that Donna Shaver, PhD., chief of the National Park Service Division of Sea Turtle Science at the Padre Island National Seashore in Texas,

is to find buried sea turtle nests and protect them. Specifically, the highly endangered Kemp's ridley sea turtles.

Kemp's ridley turtles usually come onshore in groups called arribadas (Spanish for arrival). Despite a number of volunteers combing the beaches, many of the turtle nests are not initially identified.

"The turtles nest between April and July. Somehow they choose the windiest day to come ashore.

This causes their shallow tracks to be blown away. Despite having a large group of volunteers and a number of staff who scan the beach for turtle tracks; we sometimes cannot find the nests," said Shaver.

Inspired

by rescue dogs that are specially trained to find survivors of catastrophic events Shaver started training her Cairn terrier, Ridley, to find the turtle nests. She began by training Ridley to find treats on the beach, then she placed the treats in evacuated nest in hopes he would begin to associate the nest with the treat. He quickly learned to find the nests. To familiarize the dog with the unique smells associated with the Ridley's nests, Shaver took Ridley to numerous nest sites and to the area where the eggs are kept during their incubation.

The nests are often several miles apart on the 70-mile long national seashore, the heat can be wicked and very hard on dogs. Ridley is only called upon when the human volunteers have given up their search and the wind has abated allowing him to sniff the air and catch the scent.

Two years ago, Shaver called her fiancé to bring Ridley to a site that had been searched for more than five hours. Within five minutes the dog zeroed in on an area near a pile of old fish bones.

"I was sure the smell of the fish bones was what got his attention, so I took him back to the area I



NICOLE MOLLETT / SEATURTLE.ORG

Nesting Flatback turtle

Australia's most common sea turtle is under threat from feral pigs

Pigs are digging up and eating eggs laid by flatback sea turtles that nest on the west coast of Cape York Peninsula. Authorities are trying to learn more about the feral pig behavior patterns in hope of being able to better manage their numbers. ■

thought the nest might be located. As soon as I let him loose Ridley returned to the spot by the old fish bones. I took him away again, but as soon as I released him he ran back to the spot and this time he pawed the sand until he uncovered an egg," Shaver said.

More than 100 eggs were found in the nest Ridley located. If the nest had not been recovered, it is unlikely any of the hatchlings would have survived. Ridley has located a number of "stumpers" (nests that humans cannot find) since starting his 'volunteer' service to the turtle rescue efforts.

"I am so please with the success of Ridley that I am now training another Cairn terrier. Her name is Kayleigh. I hope she will become as valuable a member of our team as Ridley in helping us preserve the Kemp's ridley sea turtle," Shaver concluded. ■



Ridley watches Dr Shaver remove eggs from the turtle nest



Turtle dogs Ridley and Kayleigh help in the rescue of Kemp's ridley turtle eggs



Baby loggerheads take a wrong turn

Hundreds of baby loggerheads were rescued, north of Brisbane, Australia, as they headed along a road instead of into the ocean.

A resident said the turtles were confused by a bright light near the beach. Area resident and staff from Australia Zoo helped gather the hatchlings and take them to the sea. ■



STEPHANIE KERN / SEATURTLE.ORG / CC

Baby Loggerhead sea turtle

More than 600 cold-stunned turtles found in Florida

Frigid waters in Florida during the first two weeks of January shocked a record number of sea turtles into a coma-like state that would have killed them if they were not rescued.

Volunteers and employees from Gulf World Marine Park in Panama City Beach worked tirelessly to rescue cold-stunned turtles from drowning. The turtles went into shock due to freezing temperatures; since they are cold-blooded they're not able to move once their body temperature reaches a certain point.

Allen Foley, a wildlife biologist with the Florida Fish and Wildlife Conservation Commission said, "If populations were at normal levels, sea turtle species would do just fine with an event like this every thirty or forty years. But today's populations are a fraction of what they were historically."

Most of the cold-stunned turtles have been returned to the ocean. While clearly harmful, the event may have had a positive outcome. Conservationists hope that the attention this event brought to the public will translate into action to save from extinction, creatures that have existed since the age of dinosaurs. ■



FILE PHOTO

Green sea turtle at Caymans sea turtle farm

Turtle meat price soars

The Turtle Farm in the Cayman Islands has decided to raise the price of green sea turtle meat. Turtle steaks, stew meat, manavelin (odds and ends), and bone will triple in price.

Calicia Burke, marketing manager of the Turtle Farm, said that farmed turtle meat is one of the rarest forms of food and is found only in the Cayman Islands and comes only from the Cayman Turtle Farm. The farm raises its own turtles thereby avoiding the need to take any sea turtles from the wild. Eating turtle meat holds a cultural significance to the Caymanian people. ■



MUSTAPHA AKSISSOU / SEATURTLE.ORG / CCDN

Turtles treated for debilitating disease

A number of scientists and veterinarians gathered at the Gumbo Limbo Nature Center in Boca Raton, Florida to treat green sea turtles suffering with golf-ball-sized tumors known as fibropapilloma.

Researchers say the tumors are turning up in alarming numbers on sea turtles all over the world. Researchers are scrambling to find a cure. Most often the tumors are located all around their eyelids and on their eyeballs compromising their survival in the wild.

The tumors were first observed in the late 1930s. The disease does not affect humans, but attaches to loggerhead sea turtles and a variety of marine fish. The prevalence of the tumors in turtles found in the Intracostal Waterway lagoons leads many to suspect the tumors are caused by runoff from fertilizer and farm waste. ■



BLUEREFAQUARIUM.CO.UK

Newquay aquarium welcomes Homer the turtle

Newquay's Blue Reef Aquarium in the UK, welcomed a blind turtle following his rescue in Greece.

Homer was rescued by Archelon, the sea turtle protection society of Greece, after being discovered. It is believed Homer was hit by a ship's propeller. Homer is unable to hunt or feed due to the severity of his injuries and could not be released back into the wild.

David Waines, spokesman for Blue reef Aquarium, said that once he is released from quarantine Homer will be transferred in to our 250,000 liter ocean display where he will be monitored by aquarists who will feed and care for him. Waines also noted that Homer's presence in the aquarium will help raise awareness of the importance of sea turtle conservation and rescue work throughout the world. ■

Homer the blind sea turtle on his way to his new home

Loggerhead sea turtle

Bottom longline fishing in the Gulf of Mexico

U.S. Fisheries Service proposes re-opening bottom longline fishing this year despite the decline in loggerhead nesting populations. NOAA will accept 1,152 loggerhead incidental takes and 631 dead loggerheads over the next three years. Environmental groups in Florida successfully halted this fishing technique last year. Florida loggerhead nesting declined more than 40 percent over the past decade and 2009 was the fourth lowest nesting year on record. ■



PHOTO COURTESY OF TURTLES.ORG

Green sea turtle with fibropapilloma tumor



Choosing A Technical Instructor

Text by Ron Akeson
Photos by Barb Roy

As I have grown to be an experienced diver, my standard for choosing an instructor to train or mentor under, has also evolved. When I signed up for my first scuba class, it really didn't make any difference to me who was going to teach it. The excitement of learning to breathe underwater was the only thing that mattered.

As it turned out, my instructor was a past Executive Director of NAUI and an ex-Navy Seal. It wasn't until I had some real diving experience to compare my skills to, that I really began to appreciate how well trained I was, and how a good instructor can make all the difference in the world.

Now, I seek only the top (and often hardest) instructor trainers when I require additional training for myself, and I love the challenge. What I have come to realize is that you can be trained by any dive center that offers technical instruction, but for the knowledge to truly stick with you and sink in, the instructor must be good at the craft of teaching.

So, what do you look for when selecting a dive instructor? Even more important, what do

you look for when selecting a technical diving instructor? The answer is not as black and white as you might imagine, because an excellent instructor doesn't have a tattoo on his or her forehead stating "top instructor". So, let's take a look at what makes a good instructor and the criteria that you can use to select one. While we will concentrate on technical diving instructors, most of

these principles can be applied when selecting any instructor, including recreational courses.



Preparation for technical class at Mukilteo, Washington State, USA

PHOTO ILLUSTRATION



Technical instructor, Ron Akeson

Compatibility

Arguably the most important characteristic has nothing to do with their qualifications; it's your gut feeling that counts. Plan to meet with your prospective mentor and see how the two of you get along. There's nothing worse than taking a course from someone you do not like or respect, no matter how qualified or experienced they are. Above all you need to have respect for your instructor, and feel that you have something to learn from them, or continue the search for a different one. This will go a long way in allowing yourself to be receptive to their teachings.

Diving experience

Once an instructor is favored, you need to know what diving experience they have. They may talk the talk, but do they walk the walk? Do they do actual dives or are most of their dives with students in a controlled atmosphere? There is something to be said for real-world experience and doing actual technical dives each month. Maybe they send out a newsletter or list upcoming dives on their website.

Some of the most important knowledge that your instructor can teach to you is from the things that went wrong or problems that arose on their personal dives. Learning from another's mistakes is an important part of the teaching process. So, during your selection process ask the prospective instructor, what is the worst thing that has happened to them on a dive, and we have ALL had things go wrong.

Similar interests

"I look for someone with the same interests that I have," comments Rob Wilson, a CCR Trimix diver from Marysville, Washington State. "For example, Ron was a no brainer for me. We both share the same interest in wrecks. Come to find out, it's the



It's a good idea to get used to using twin tanks before you start a technical diving course



Technical instructor with students at Northern Gulf Islands in British Columbia, Canada

work is like a car with no tires, it will go nowhere real fast. Does the instructor's knowledge exceed the course you are about to take. One way is to ask them the highest level they can certify to. Another is to purchase the book beforehand and read it. A good example might be whether they have an integral knowledge of decompression science and algorithms, which is extremely important for deep trimix diving. Ask to see their informational database (books, articles, certificates), which might already be on display in their classroom or the dive center. This will help you in deciding if their education and training in technical diving is adequate to answer any questions you might come up with.

Continuing education

I personally like to know if the instructor is continuing with their own education through additional courses and/or seminars.

same wrecks, too. I also would look for someone who has actually done some dives beyond their training hopefully the dives I'm planning to do.

"I wouldn't want a "card collector". A tech instructor needs to go out and actually do the dives he certifying people for. You can always find a "tech" instructor but not many are out doing "tech" dives unless they are doing a class.

"For example, we had a Trimix instructor come out on a deep dive with students. The instructor turned out to be a complete disaster. We did have a couple of unforeseen challenges but nothing that could be considered a deal breaker. It is wreck diving after all. This person had no experience outside of teaching. I wonder what kind of divers they will produce with this kind of attitude."

Knowledge

Familiarity with the subject matter should be next. No matter how much dive experience they have, a limited knowledge base of the course

Technical diver and cloud sponge on the Sunshine Coast of British Columbia (right); Using Force fins for training (below); Pool work and rebreathers (bottom left)

Reputation

A solid reputation in the local dive community can also be a valuable consideration. Being well known for their diving prowess is a strong indicator that they know what they are doing. A 'word of mouth' recommendation by a previous student is another way to find out additional opinions of how a course was conducted. This should not be overlooked

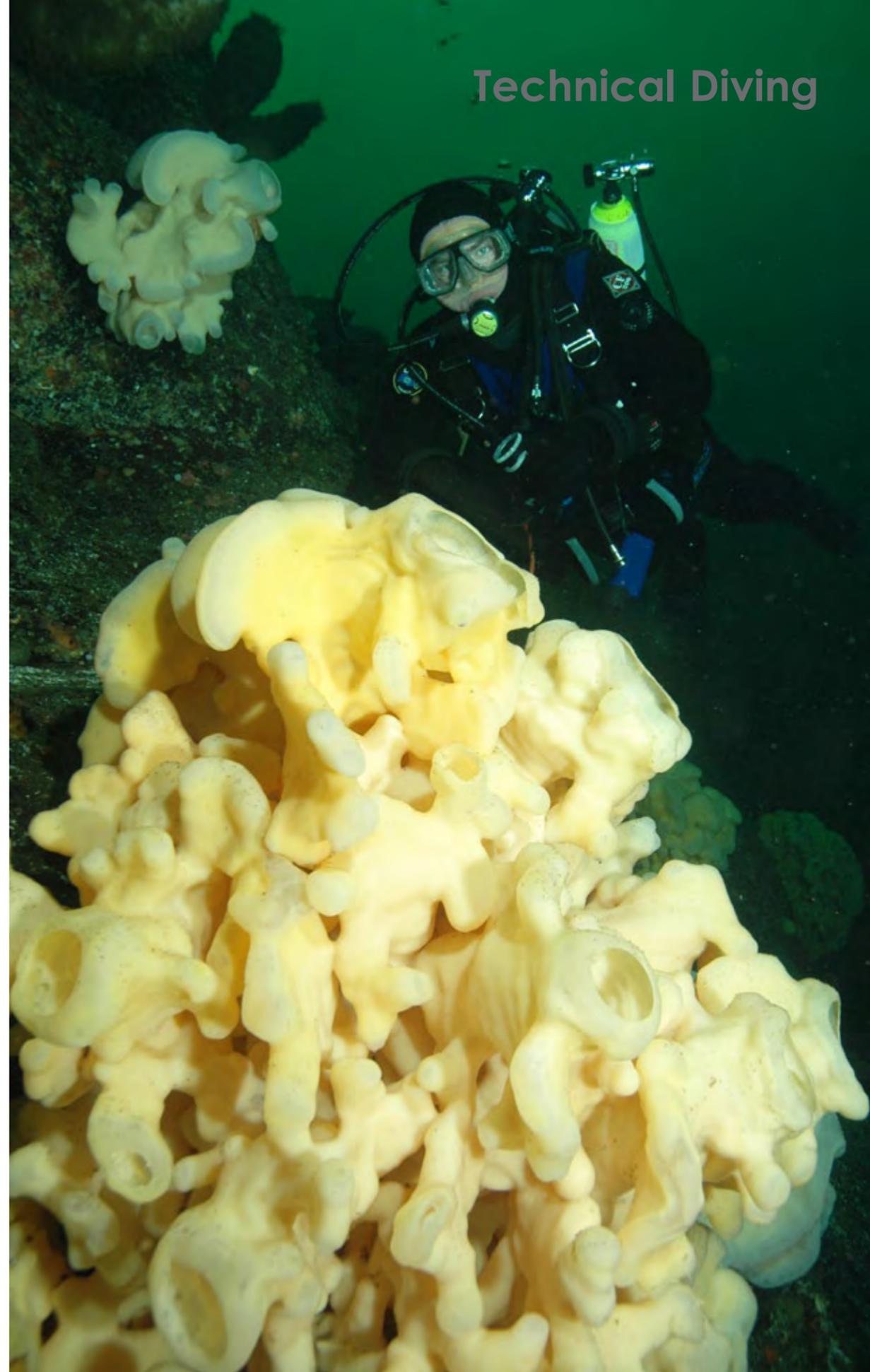


because first hand information might give you an idea if the person feels they received adequate instruction and feels comfortable to continue in that level, or do they feel they were shortchanged.

Teaching experience

Dan Dwarter, another CCR Trimix diver from Washington also believes experience counts; "What I look for in a technical dive instructor is experience. Anyone can go out and get a certification saying

Technical Diving





they can teach technical diving, but it is more important that the instructor is DOING the dives. They have the classroom knowledge, and the field knowledge for said style of diving. Basically I want to go with someone whom I feel confident diving with at those depths."

With this in mind; understandably technical diving isn't for everyone. The bottom line is whomever you choose must possess the ability to teach in a manner so you, the student, can learn to the best of your ability. Don't be afraid to travel for the instruction either. Maybe the instructor 50 miles away will make your learning experience worth the journey compared to the instructor across town. If you use the above criterion and utilize common sense for selecting an instructor, you should have a very pleasurable experience in the long run!

Ron Akeson is an Instructor Trainer, marine biologist and professional photographer and cinematographer with over 30 years of industry experience. For more information, see his website at: www.adventuresdownunder.com ■

Technical Diving



LEFT TO RIGHT:
Technical diver,
Rob Wilson, on a
deep dive in Neah
Bay, Washington
State, USA

Training for cave
diving in Mexico

Technical diver
inspecting sponge
wall off the Sunshine
Coast in British Co-
lumbia, Canada

Gear set-up at the
dock on the Sunsh-
ing Coast of Van-
couver Island, British
Columbia



Edited by Peter Symes

Ancient whale populations were probably massive

Research indicates modern estimates of a “normal” population may be way off, and that recovery of the populations of great whales is still in its very early stages.

When a particular species is said to be decimated by centuries of hunting, it's often difficult to accurately say what a “normal”, fully-recovered population might number.

Historical records indicate that past whale populations were plen-

tiful. For example, it was said that when settlers arrived in the New World in the 17th century, they found waters so thick with whales, it was said you could walk across the bay of Cape Cod on their backs. Such stories have usually been dismissed as fantasy, but DNA research that show numbers of pre-hunt populations may be vastly underestimated.

Getting the numbers right matters because it has only been since 1986 that a ban on whaling has allowed populations to slowly recover, but already, discussions are underway to potentially allow

some commercial whaling to resume when populations reach 54 percent of their “historic” levels. This is generally assumed to be the population of the mid-19th century, before the explosive harpoon was invented. Such a decision would be based on old estimates of population, mostly conducted by people working for the International Whaling Commission (IWC). But if this historic benchmark is too low, the whaling moratorium must continue.

Genetic findings

The IWC believed that before large-scale whaling began, the North Atlantic was home to about 20,000 humpback whales. With a current population of about 10,000 and rising, this meant that under the 54-percent rule, hunting could soon resume. However, genetic research published in 2003 by Stephen Palumbi and Joe Roman of Stanford University's Hopkins Marine Station calls the IWC's numbers into question.

The pair had investigated whales for

signs of genetic variation, which is a technique to estimate the size of the population in the past since large populations tend to accumulate diversity through random DNA mutations and breeding, while small populations lose it through inbreeding. The results were dramatic. The team estimated the pre-exploitation population was more than 20 times as great, at 240,000. Globally, they suggested, more than 1.5 million humpbacks may once have roamed the oceans, rather than the 100,000 estimated by the IWC.

Obviously, if the researcher's findings hold water their numbers would mean recovery is the extremely early stages—something that wouldn't sit well with pro-whaling nations keen in resuming whaling. Unsurprisingly, Palumbi got a hostile reception when he presented their findings to the IWC in 2004,

Undermining IWC's estimates further has been the discovery of “cooked” logbooks from nations like the Soviet Union. According to *New Scientist*, Soviet whaling fleets killed 25,000 humpback whales in the Southern Ocean between

1959 to 1961, while reporting a catch of just 2,710 to the IWC. The number of whales brought home also probably does not equal the number killed at sea, says Roman.

The numbers remain controversial and Palumbi and Roman's analysis is being criticised among other things for resting on an assumption that the particular whale population under scrutiny never bred with others. Critics point out that the now-distinct humpback populations of the North and South Atlantic may well have once done just that. It could be that Roman and Pa-

More than 1.5 million humpbacks may once have roamed the oceans, rather than the 100,000 estimated by the International Whaling Commission.

lumbi have inadvertently estimated the entire Atlantic humpback population, or even the global population rather than that in just the North Atlantic.

Palumbi and Roman are not alone, however. Charles Scott Baker, a conservation geneticist at Oregon State University in Newport, has used DNA analysis to investigate minke whales. IWC estimates put their number today near their historical levels of around 600,000 globally. But Baker reckons that as recently as 300 years ago there were probably close to 1.5 million of them. This finding also suggests the species' recovery is still at an early stage. ■

Medieval whalers not at fault for decline

A DNA profile of a 450-year-old whale bone from Labrador's south coast—a North Atlantic right whale's humerus—collected from the remains of a shipwreck at the historic Red Bay whaling site along the Strait of Belle Isle on Labrador's south coast shows that Canada's most endangered species was already suffering from a critically small population and a lack of genetic diversity before Basque whalers began harvesting the giant mammals in the 16th century.

The Basques have long been blamed for decimating the right whale population off Canada's coast. But the new research by a team of Canadian and U.S. biologists, published in the latest issue of the journal *Conservation Genetics* indicates that right whales were rarely killed by the Spanish-based whalers and that oil-rich bowhead whales were almost exclusively their targeted species.

The samples revealed a relatively low level of genetic diversity among the whale's North Atlantic population both today and in the past—a result that makes clear the species' problems in Atlantic Canada began long before the Basques arrived in the region in the early 1500's, the team has concluded.

The latest findings appear to point the finger at a post-1400 cooling period known as the Little Ice Age for the restricted numbers of right whales along Canada's eastern shores. ■



Dying Struggles of the Spermaceti Whale. Image Date 1837



What killed 300 right whales?

In the last five years, more than 300 southern right whales have been found dead in the waters off Argentina's Patagonian coast, one of the most important breeding grounds for the species.

Possible causes being examined include biotoxins—naturally occurring poisons that include the venom of some snakes and spiders and the “flesh-eating” bacteria, *Necrotizing fasciitis*—disease, environmental factors and lack of prey, particularly the tiny krill that make up the bulk of the southern right's diet.

Another theory put forward has been the effect of gulls, which can act like parasites, gouging skin and blubber from the whales' backs.

The main evidence that will be examined are tests on samples taken from beached whale calves, which have shown “unusually thin” blubber, said the United States-based Wildlife Conservation Society, which described the die-off as “a perplexing and urgent mystery”.

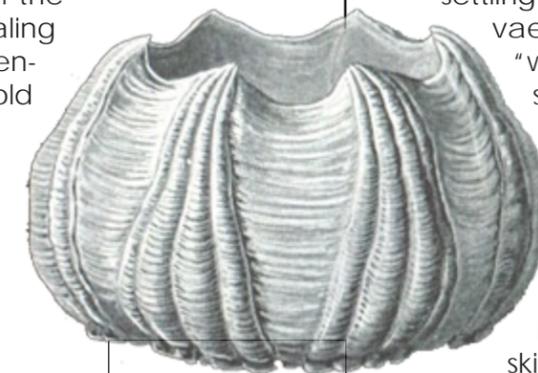
“We need to critically examine possible causes for this increase in calf mortality, so we can begin to explore possible solutions,” said Marcela Uhart, one of the WCS scientists who first discovered the problem. “Finding the cause may require an expansion of monitoring activities to include the vast feeding grounds for the species.”

Part of the concern about the recent die-off is that the dead whales have

been found around the Peninsula Valdés, where one third of the global population of southern right whales is thought to use the protected bays for calving and nursing between the months of June and December.

“Peninsula Valdés is one of the most important calving and nursing grounds for the species found throughout the southern hemisphere,” Howard Rosenbaum, director WCS's ocean giants programme, and a member of the International Whaling Commission's scientific committee told the UK daily, *The Guardian*.

“By working with the government of Argentina, the Province of Chubut, and our diverse team of experts and specialists, we can increase our chances of solving this mystery, the critical next step to ensuring a future for this population of southern right whales.” ■



Most of the barnacles are unique to the brand of whale. The barnacle *Coronula diadema* lives only on humpback whale skin, for example, while gray whales host one called *Cryptolepas rhachianecti*

What is the deal with the barnacles and ‘bad skin’?

Barnacles regularly colonize the skin of filter-feeding whales, and they often do so in huge numbers. One humpback whale, for instance, can host almost 1,000 pounds of barnacles.

So, how does a barnacle get onto a whale in the first place? Marine biologists speculate that the barnacles reproduce during the whales' breeding season, when the whales mill around in warm, shallow waters rather than moving through the open ocean. Each barnacle parent can release anywhere from 10,000 to 20,000 spawn, and they survive for several weeks in the water. When a whale does swim by, research suggests, the drifting larvae pick up a chemical signal that tells them to hop on.

Location, location, location

Barnacles are picky. They like spots where the flow of water is consistent, like the head or the fins. So, instead of settling wherever they land, the larvae use their front antennae to “walk” around the whale in search of prime real estate. Once they're satisfied with their location, the barnacles literally dig in. As they mature into adults, they form tube-shaped cavities in their shells that actually draw in prongs of growing whale skin. The result is firmly rooted attachment.

The barnacle-whale relationship is generally considered to be obligate commensalism—a type of symbiosis where one species benefits, and the other isn't affected either way. Still, it's possible that too many barnacles could cause drag, or invite infection if they penetrate too deeply into the whale's flesh. On the other hand, it's been suggested that for male humpbacks, who fight over females by ramming and slapping at each other, a sharp barnacle coating may be helpful as a set of brass knuckles. ■

Southern Right Whale off Patagonia

MARCELO MAMMANA

Whales are good for the climate too, they are carbon sinks

A century of whaling may have released more than 100 million tonnes of carbon into the atmosphere, U.S. scientists told the recent Ocean Sciences conference in Oregon.

Whales store carbon within their huge bodies, and when they are killed, much of this carbon can be released. Dr Andrew Pershing and his colleagues from the Gulf of Maine Research Institute calculated the annual carbon-storing capacity of whales as they grew. In their initial calculations, the team worked out that 100 years of whaling had released an amount of carbon equivalent to burning 130,000 sq km of temperate forests, or to driving 128,000 Humvees continuously for 100 years. Pershing stressed that this was still a relatively tiny amount when compared to the billions of tonnes produced by human activity every year. But he said that whales played an important role in storing and transporting carbon in the marine ecosystem.

Ocean forests

Pershing described whales as the “forests of the ocean”. “Whales, like any animal or plant on the planet, are made out of a lot of carbon,” he said, “And when you kill and remove a whale from the ocean, that’s removing carbon from this storage system and possibly sending it into the atmosphere.” Whereas when whales die naturally, their bodies sink, so they take that carbon down to the bottom of the ocean. “If they die where it’s deep enough, it will be stored out of the atmosphere perhaps for hundreds of years.” Simply leaving large groups of whales to grow, he said, could

“sequester” the greenhouse gas, in amounts that were comparable to some of the reforestation schemes that earn and sell carbon credits.

He suggested that a similar system of carbon credits could be applied to whales in order to protect and rebuild their stocks.

Iron pumps

Sperm whales in the Southern Ocean should also be credited for their role in offsetting climate change by introducing iron into the upper layers of the oceans, said Trish J. Lavery of Flinders University in Adelaide, Australia.

Skimpy levels of iron in the Southern Ocean limit growth of the floating meadows of plankton there, Lavery said. This limitation has inspired human experiments in adding iron to trigger a big plankton bloom. Sperm whales, however, feed by diving for squid in the cold depths of the Southern Ocean. This zone normally acts as deep storage for nutrients, Lavery said. So, anything the whales bring up effectively introduces something new to the upper waters.

The extra iron that whales bring up from their deep feeding encourages plankton growth. That growth traps carbon, much as human-run iron-enrichment experiments in the ocean might, Lavery and her colleagues con-

tended. According to the team’s calculations, sperm whales in the Southern Ocean may be capturing a net five million metric tons of carbon from the atmosphere per year.

The first analysis of whales’ effect on greenhouse gases determined that warm-blooded residents—with whales as the dominant force—might be respiring 25 percent of the carbon fixed in the Southern Ocean, she said. Later estimates have revised their share downward, and the most recent calculation puts their contribution at 0.3 percent. That’s not huge compared to global output, but it’s still 17 million tons of carbon a year.

Using numbers from studies of feeding and nutrition, Lavery and her colleagues calculated that each whale brings up about ten grams of iron a day from the depths and then defecates it at the surface. The beauty of this sperm whale output is that it takes the form of drifting liquid plumes that can feed life in the upper ocean, Lavery said. She noted that experiments with iron have struggled with iron fertilizers that clump and sink before upper-water plankton can eat all of the goodies. Yet, she said, those experiments documented measurable carbon trapping with even less iron fertilizer than sperm whales contribute. ■



Sperm whales in the Southern Ocean may be capturing a net five million metric tons of carbon from the atmosphere per year

ERIC CHENG



Sperm whales tracked hunting squid in teams for first time



It appears that sperm whales work together during feeding time to corral Humboldt squid by rotating the more demanding roles of the hunt.

At least that's what data-recording tags on three sperm whales report, as the animals were tracked swimming and feeding in the Gulf of California.

According to Professor Bruce Mate from the Hatfield Marine Science Center in Oregon, the whales would herd the squid into a giant bait ball, and one of them would dive to the bottom of the ball where she would prevent any squid for escaping.

Each time, different whales would take on this specific role.

"We can see that they're actually changing their roles over time ... It may be that each individual takes it in turns to do the most physiologically demanding task—the deep dive," said Mate.

The study, conducted in cooperation with Jorge Urban of the Autonomous University of Baja California Sur, involved tags that tracked the whales' movements for up to 28 days, before detaching themselves

and floating to the surface where they are retrieved by the scientists.

This method of hunting —by corralling the prey—has been found in dolphins and humpback whales. Unfortunately, because sperm whales often dive deep—the three that were tracked dove to 800 meters deep, and

sometimes as deep as 1,500 metres—tracking them was more of a challenge.

"Our next step will be to image the squid at the same time as tracking the whales," Mate said.

"And to tag more members of the same group so that we can track their movements."



Humpbacks named "creatures of interest" in case of missing herring

Something is holding down the herring population of Alaska's Prince William Sound, and marine scientists are homing in on some rather large suspects—humpback whales.



Twenty-one years have passed since the Exxon Valdez, the supertanker, ran aground and leaked nearly 11 million gallons of crude oil causing one of the worst man-made disasters in history. In the late 1980's, before the spill, record commercial harvests of herring were landed, but the stocks took a major hit from the disaster that happened just when herring were about to lay eggs.

Many Prince William Sound fishermen still curse Exxon for the absence of herring, but the population should have rebounded by now. One hypothesis put forward by Jan Straley, a marine biology professor at the University of Alaska Southeast, is that humpbacks—traditionally summer residents in the sound—are taking a big bite out of vast herring schools that form in the deep water of the sound's fjords each autumn. Straley and other researchers have found that

humpbacks are now showing up in significant numbers, even in winter.

When summer resident whales leave, other humpbacks move in. Some summer residents are even skipping their annual transoceanic mating and birthing trips to Hawaii, Mexico or other warm waters in favor of icy Alaskan waters.

"It did show that whales were exerting predation pressure on Prince William Sound herring, which is potentially impeding the recovery," Straley said. There are, however, also other suspects in the herring mystery: disease, ocean changes, contaminants and competition from other fish. One

researcher is studying whether juvenile herring spend so much energy fighting a disease, Ichthyophonus, that they don't survive the winter when there's no food.

Herring play a vital role in the food chain. The silvery fish with blue-green upper bodies—considered large when they reach nine inches—are food for eagles and other sea birds, halibut and cod, and most important to humans, five varieties of Pacific salmon. ■

