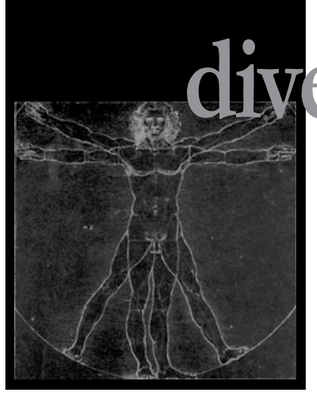


ED.— ALWAYS CONSULT A PHYSICIAN FIRST BEFORE BEGINNING ANY EXERCISE OR FITNESS PROGRAM.

Back & Biceps

Text and photos courtesy of Gretchen M. Ashton CFT, SFT, SFN, NBFE

The biceps are recruited along with the muscles of the back when the body is required to perform powerful physical activities such as lifting and pulling. To maximize their full potential, and because of their integrated function, the biceps and back are ideal muscles to train in the same exercise session. In the same way divers rely on the buddy system, the biceps and back accomplish together what they cannot individually. Divers will benefit from both the physical strength and mental discipline of this exercise combination.

Adaptations to diving activities are numerous and include lifting and handling gear on or near the body, climbing boat ladders under the weight of gear, assisting other divers with gear or rescue, and construction, industrial and technical diving tasks.

Workout and muscles

Supersets combine more than one muscle group into an exercise sequence without a rest. Giant sets are multiple exercises that target the same muscle for more than one exercise in a sequence without a rest. This workout is a thorough combination of supersets and giant sets for major muscles, prime movers and stabilizers, which include the latissimus dorsi, trapezius (mid and upper), rhomboids, deltoid (anterior and posterior), biceps (brachii, brachialis, brachioradialis). Shoulder involvement provides another layer of protection and strength through a greater range of motion. The exercises shown here are demonstrated with dumbbells. If modular resistance machines or cables with weight stacks are available, greater power and strength can be added with more resistance.

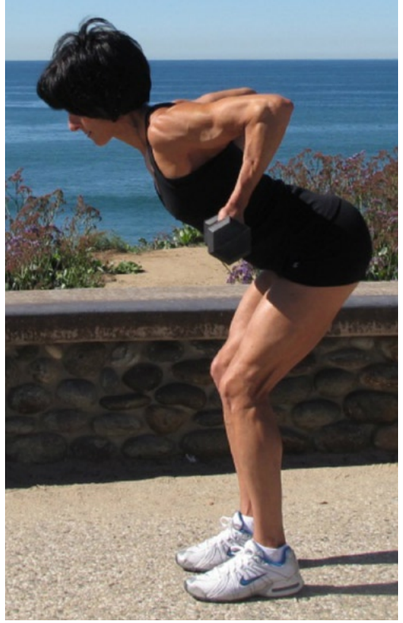
Sets, repetitions and intervals

Select a weight that is comfortably performed for 15 repetitions. Now

Concentration Curl beginning (above), middle (right) and ending position (above)

using the same weight, complete 25 repetitions or one-minute intervals, whichever is longer. Continue to the next exercise without stopping to rest until all four exercises have been completed. After each round, rest for one to three minutes. The workout is finished after four full rounds or 16 sets. Target a completion time of 45 minutes. Remember to sip water during rests.

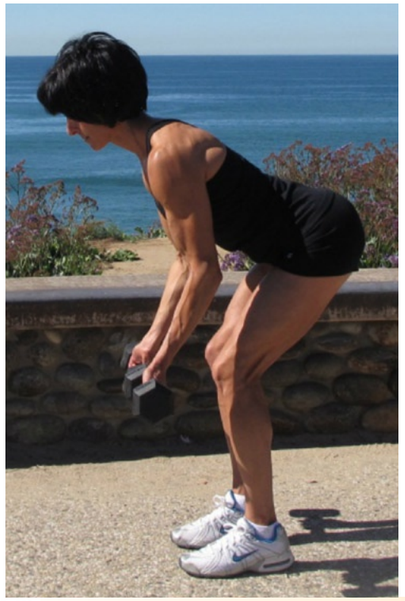
Concentration Curl. This exercise is great practice for the mind-muscle connection, thus its name. In a seated position (as shown on previous page), brace the back of the arm between the elbow and shoulder against the inside of the same thigh above the knee. Count to four while exhaling and lifting the weight, then count to four while inhaling and lowering the weight. Watch the biceps work and feel the sensations of the exercise. It is very rewarding and motivating.



Bent-Over Dumbbell Row middle position

Precautions. The elbow will sometimes slide up and/or on top of the leg. This usually happens when divers attempt to lift the weight by leveraging with the body instead of using the biceps. If this "unraveling" of form occurs, pause, reset and continue with proper form.

Bent-Over Dumbbell Row. Along with developing strength, this exercise helps maintain good posture. The standing position involves muscles of the lower body similar to diving activity. Stand with feet between hip and shoulder width, bend forward at the hip, contract the abdominals and the buttocks to protect the low back, tuck shoulder blades down and toward center (retract), keep head in line with the spine, reverse the grip (palms up), straighten wrists, bend knees slightly, and extend arms. Inhale before beginning the movement and exhale while pulling the elbows back along the sides of the torso. Inhale again while resisting and lowering the weights. Notice the flat back. Concentrate on pulling with the biceps and large muscles of the back. This is a BIG exercise and meant to be performed with BIG muscles. Some divers will enjoy performing this exercise with a T-Bar Row apparatus.

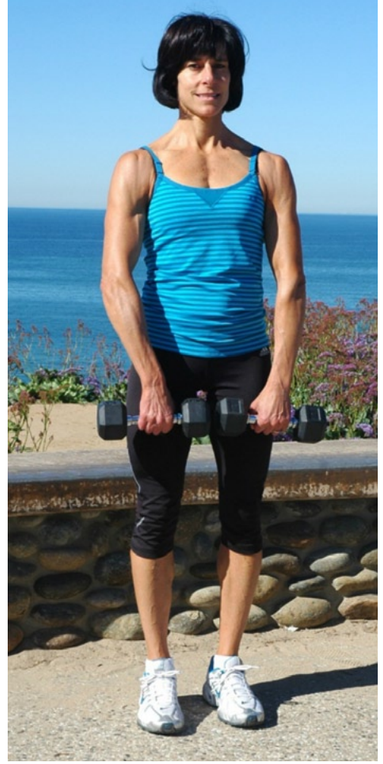


Bent-Over Dumbbell Row beginning and ending position

Standing Biceps Curl beginning, middle (right) and ending position (left)

Precautions. This exercise is not recommended in a standing position for divers with low back complications. Instead, it may be performed in a seated position with a small rolled towel or pillow placed under the abdomen for support for the low back. It may also be performed as a One-Arm Dumbbell Row, either kneeling or seated.

Standing Biceps Curl. Standing with feet about hip width apart, slightly flex the knees, contract the abdominals and buttocks, and tuck the shoulder blades down and toward center. The dumbbells are held in a hammer position in this demonstration. There is no need to twist the dumbbells at any time during this exercise, but definitely look to make sure the elbow remains alongside the torso throughout the curl. For most divers the range of motion will be complete before the dumbbell gets to the shoulder. If the elbow is pulling forward this means the movement has gone too far, the biceps is beyond contraction and the final movement came from the shoulder. Inhale before starting the exercise and exhale while lifting the weights.



Upright Row beginning (right) , middle (far right) and ending position (right)

Precautions. Do not lean backwards during the lift to prevent strain in the low back. If the dumbbells won't come all the way up, drop the amount of weight or do a partial repetition.

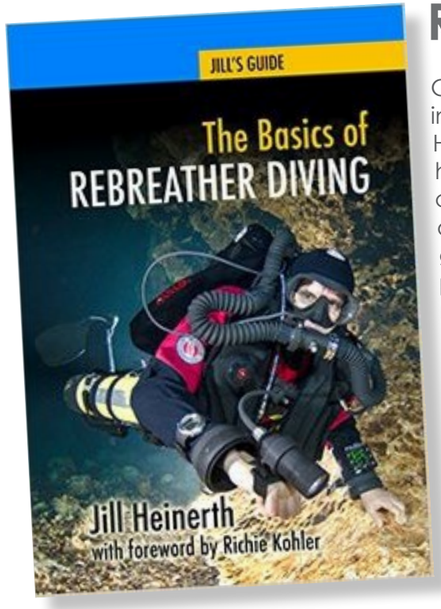
Upright Row. Raise the weights leading with the elbows. Keep the weights close to the torso. Control the speed and movement of the weight especially while lowering. Inhale to begin and exhale while lifting the weights.

This exercise may be performed in a narrow, mid or wide position from the center of the body. The greater the distance between the dumbbells, the more difficult the exercise is to perform. The wider the position, the lower the elbows will raise because of natural strength and range of motion restrictions. It may be fun to try a different position in each round.

Precautions. Never allow the elbows to drop below the hands when performing this exercise. The greater the flexibility, the higher the elbows. When fatique prevents the elbows from lifting higher than the shoulders, scarecrow (partially lift) the arms with elbows leading. Certain shoulder injuries or conditions may preclude this exercise. ■

Gretchen M. Ashton is registered with the National Board of Fitness Examiners. An advanced diver, International Sports Sciences Association Elite Trainer, and world champion athlete, Ashton developed the ScubaFit program and the comprehensive FitDiver program, which includes the first mobile app for scuba diver fitness. Ashton is the co-author of the PADI ScubaFit Diver Distinctive Specialty course. For more information, visit: ***Scubafit.com***

media



Rebreather Diving

Get on the rebreather trend! Rebreather diving is one of the fastest growing segments of the diving community. Author and leader in the field, Jill Heinerth, who is a professional rebreather diving instructor and cave diver, helps you navigate the complex and often intimidating world of rebreather diving. Get straightforward information on the basics and technical aspects of diving with a rebreather as well as the history of rebreather diving and guidance for beginners. Read tips on how to make the right choice when purchasing a rebreather. Already own a rebreather? Gain insight into the new trends, academics and the future of CCR diving. Most importantly, this book covers safety culture in rebreather diving with accident analysis and prevention. The book is packed with lots of full color photographs, drawings and charts, as well as personal anecdotes from the author.

Perfect Paperback: 228 pages
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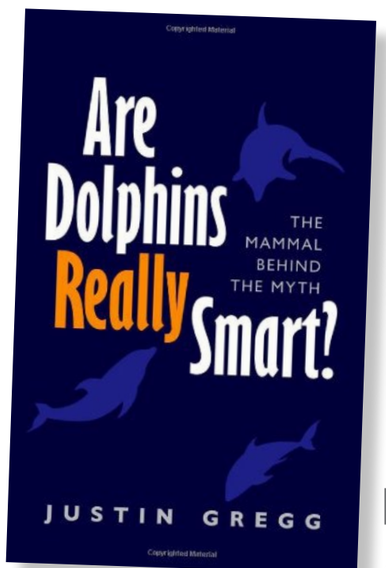
Date: 2014
ISBN-10: 1940944007
ISBN-13: 978-1940944005



Dolphins

Are Dolphins Really Smart?: The mammal behind the myth, by Justin Gregg. In this book, the author, who is a research associate with the Dolphin Communication Project and co-editor of the academic journal *Aquatic Mammals*, takes an indepth look at dolphin intelligence, separating scientific fact from fiction. The latest research in animal behaviour is presented and comparisons are made with scientific studies of other animals, such as great apes and crows. With underlying evidence, Gregg offers an up-to-date and comprehensive look at this fascinating animal—a new perspective, which many who love dolphins may find of great interest.

Hardcover: 296 pages
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Date: 1 December 2013
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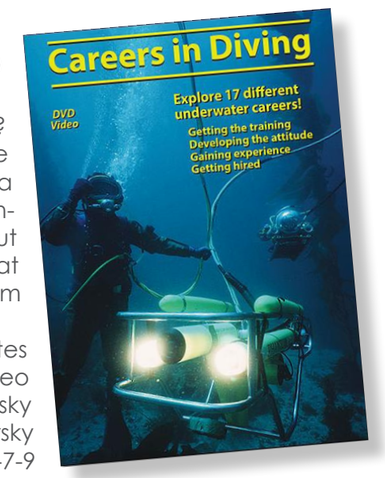
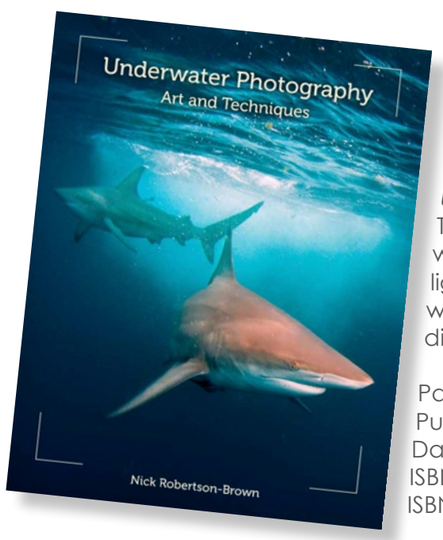
ISBN-13: 978-0199660452

Get a Job



Want travel, adventure, and excitement in your life? Love to dive? Want to do more of it? From Hollywood cinematographer to FBI dive team leader, professional divers get around. What's it like to be a dive boat captain, marine biologist, wildlife videographer, scuba instructor, dive store owner, dive guide or a commercial diver? Find out with this informative DVD, which offers a glimpse into the work that divers do on the job. Available at Hammerheadpress.com

Run Time: 125 minutes
Standard definition 16X9 DVD video
Written, filmed, directed and edited by Steven M. Barsky
Produced by Kristine C. Barsky
ISBN 978-0-9740923-7-9



Underwater Photography

Underwater Photography: Art and Techniques, by Nick Robertson-Brown. This is a practical book for divers interested in taking better images underwater. It covers topics such equipment, composition, natural and artificial lighting, underwater conditions and exposure, animal behavior and underwater habitats as well as how to be a responsible photographer. The author discusses both the art and science of underwater photography.

Paperback: 176 pages
Publisher: The Crowood Press Ltd
Date: 27 Jan 2014
ISBN-10: 1847976573
ISBN-13: 978-1847976574

Shipwreck

Lost Beneath the Ice: The Story of HMS Investigator, by Andrew Cohen. In 1850, England sent the HMS *Investigator*, under the command of Captain Robert McClure to be part of one of the largest rescue missions in British history. Their goal: to find Sir John Franklin, who disappeared in the Arctic in the 1840s. The ship's crew, who did not find Franklin, stumbled upon the Northwest Passage before becoming trapped in the ice of Mercy Bay for three years. The *Investigator* was abandoned when the crew was finally rescued. The ship's fate has been a mystery ever since, until Parks Canada sent a team of archaeologists to Mercy Bay to find out what happened to it. This book by Andrew Cohen, illustrated with archival imagery and stunning underwater photographs of *Investigator*, explores the sensational story of the ship, the captain and her crew.

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ISBN-10: 1459719492
ISBN-13: 978-1459719491

Edited by Kelly LaClaire

NOAA

Dolphins using puffer fish as narcotics?

The BBC has broke new ground, filming a group of dolphins using toxic puffer fish in what seems to be an attempt by the mammals to purposefully induce a narcotic-like effect that puts individuals in mild trance states.

The footage is part of a documentary that will air on BBC One in January called, *Dolphins: Spy in the Pod*. Wildlife film maker John Downer and his crew installed remote control cameras into imitation (but life size) dolphins and followed several pods into the open ocean to capture never before seen behaviors—including passing puffer fish around like they are some kind of psychedelic, marine hallucinogen.

The video shows several dolphins deliberately playing with a small puffer fish for 20 to 30 minutes, apparently chewing it gently and then passing it to another pod member.

Rob Pilley, zoologist and series producer, stated, "We saw the dolphins handle the puffers with kid gloves, very gently and delicately, like they were almost milking them to not upset the fish too much or kill it. As a result, the fish released various toxins as a defense. The dolphins then seemed to be mesmerized and hung there up near the surface of the water."

Watching the film, viewers can see several dolphins, heads up, tails down, slowly drifting with little or no motion and staring at the sky,

And this behavior, while new to researchers, seems to be old hat. "Dolphins seem to be experts on how to prepare puffers and how to handle them," continued Pilley. "The dolphins were specifically going for the puffers and deliberately handling them with care."

While very rare, the practice of one animal using another species to alter mental or sensory states is not unknown. Black lemurs, for example, have been known to play with toxic giant millipedes, rubbing the insects all over their bodies in order to feel specific physiological effects. And In Australia, dogs have been documented becoming addicted to the psychotropic secretions of cane toads from licking their backs. ■

SOURCES: BBC; MAIL ONLINE

Maui's dolphin getting some help – but it may not be enough

The Maui's dolphin is the world's smallest and rarest dolphin and only found on the west coast of New Zealand's North Island. According to a recent report by the BBC, there are only 55 adult Maui's extant, and their numbers are being constantly threatened by fishing and disease.

Moreover, a 2012 survey initiated by the New Zealand Department of Conservation, researchers say that around 20 breeding females are living and each one only gives birth to a single calf every two to four years.

In an attempt to halt their decline, the New Zealand government is proposing an extension to a small protection zone to save the diminutive cetaceans. Dr Nick Smith, the conservation minister, has stated that the move will help reduce the biggest threat to the Maui's. "We are taking a cautious approach by banning set netting where there is clear evidence the Maui's dolphins go while not unnecessarily banning fishing where they are not."

Controversy

But local activists argue the introduction of nylon filament nets in the 1970s has been a key factor in the decline of these dolphins, and these new actions don't go far enough.

Conservationist say that more than 75 percent of the Maui's habitat still remains unprotected from set netting and trawling. They worry the Maui's could be extinct within 20 years if more isn't done fast.

"These new measures will do nothing to stop the dolphins' decline," said Dr Elizabeth Slooten from the University of Otago, who has studied these creatures for 30 years.

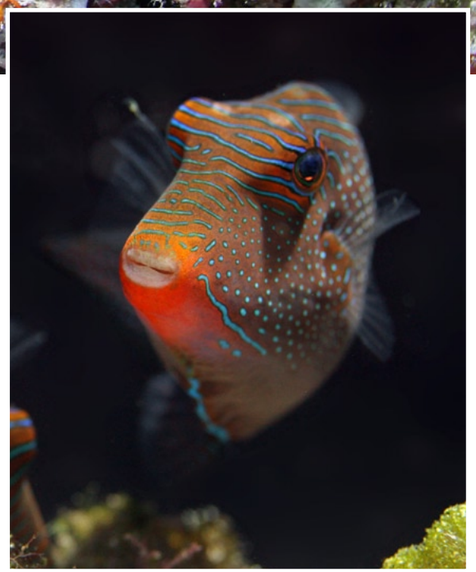
STEVE DAWSON / NOAA

In protest, the International Union for the Conservation of Nature declared the Maui's critically endangered and passed a motion urging full protection. The International Whaling Commission and the Society for Marine Mammology have also lended their voices and asked the New Zealand government to remove all fishing nets from the entirety of the Maui's habitat. ■

Diving Indonesia's Bunaken

Text by Kelly LaClaire. Photos by Kate Clark

Clingfish in yellow feather star. PREVIOUS PAGE: Large red gorgonian sea fan



Diver and white-mouthed moray eel; Papuan toby (right inset)

We're swimming fast. Too fast for my liking. I'm taking heaving gulps, and I know my tank won't last very long if we don't slow down soon. Just as I'm about to stop and risk losing my group, we hear a rapid series of bangs coming from our dive boat in the distance. Our guide, a lithe Indonesian with pistons for legs and bottomless iron lungs, points into the blue and somehow quickens his pace.

A few meters ahead to my left, my cousin, Kate Clark, an accomplished diver and tireless swimmer, senses my fatigue and looks back to make sure I haven't quit on her. She slows her speed a bit, trying to be a good buddy and stick with me. The woman is wearing snorkel fins and carrying a 40-pound camera for Pete's sake, I think to myself. How is she swimming so fast?

Kate has me check my gauge, and I groan silently as I see I've already used a third of my air. We've only been in the water ten minutes. She smiles patiently and points to her own gauge (which, of course, is still full) and then to her octopus—"You can always take a few sips off mine if you need it," her eyes say.

More banging, frantic now and louder than ever; the crew has found what they were looking for. Kate beckons me to push on, and I begin kicking with renewed vigor, knowing our prize is just ahead. After another few minutes of hard swimming, I check my pressure gauge once more—the tank is half empty. My heart is pounding audibly, and I can no longer hear the banging from the boat. My legs are throbbing, and I consider surfacing and giving up. I look up to signal Kate and see her pointing frantically ahead towards the sheer drop off of the giant wall to our

right.

Look! Look!

I shift my gaze and see them. Everything changes.

Volcanic cliffs

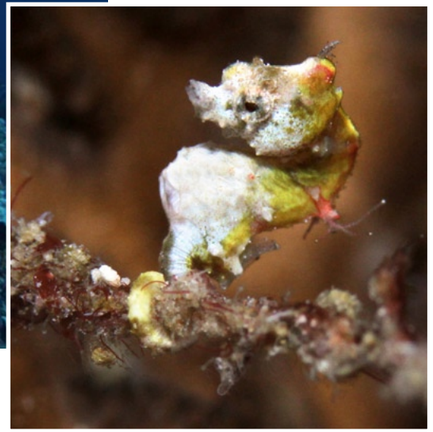
Two days earlier, our little boat drifted into a small inlet surrounded by the lush mangroves and the white sands of Bunaken. A tall, slight woman stood at the water's edge and waved us in while two dogs danced at her feet, wagging their tails energetically. Tina Melson, co-owner with Nigel Thomas of Two Fish Dive Resort, served hot tea and cookies while giving us a brief history of the island, as the boat crews and divemasters took our gear to our lodgings.

Bunaken National Marine Park covers nearly 900 square kilometers of ocean ecosystem and was established in 1991. The park is dominated by the rising crest of Manado Tau, a cone shaped peak that reaches 600 meters above sea level. From almost anywhere inside the park's boundaries you can see its lush slopes of coconut palms gathering pillows of clouds throughout the day. The dive sites around the inactive volcano feature some of the steepest, most dramatic walls in the area and are absolutely packed with life.

"The underwater landscapes around Bunaken are breathtaking," Tina told us. "There is so much diversity of marine life here—hard and soft corals, reef fish, invertebrates, pelagics, turtles and so on—that each dive offers something new and exciting for any certification level." She paused a moment before smiling, "You're really going to love it here."

She was right. The first two days, as Tina promised, were spectacular. The giant walls of the park's volcanic islands are absolutely monolithic, dropping hundreds of meters, and home to more turtles than any one area I have ever encountered. In the first several dives, we saw over

Banded sea snake; Bubble coral shrimp (top left); Detail of eye of blue-spotted stingray (left)

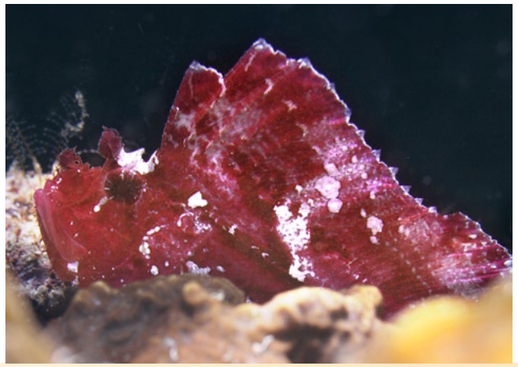


CLOCKWISE FROM ABOVE: Hawksbill sea turtle head-on; Clownfish on anemone; Flatworm on reef; Pygmy seahorse; Green sea turtle in alcove; Leaf scorpionfish

a dozen hawksbill sea turtles and several massive "greens" that were easily six feet long and as big as Smart Cars.

One friendly and curious green sea turtle took more than a passing interest in Kate's camera and spent several moments following her around, inspecting the domed housing with its mouth agape and its eyes wide with wonder. In some areas, they were so ubiquitous that soon—and I cringe at having to admit this—I was actually beginning to pass them by without a second glance.

Banded sea snakes and leery morays are also extremely common in the nooks and crannies of the rocky outcroppings—the small caverns and deep cracks in the granite making excellent hunting grounds. Large numbers of blue-spotted stingrays make the sandy coral breaks along the sheer cliffs their home as well, but they are rather shy and divers need to keep their cameras at the ready if they want a chance at capturing a good image.



Each underwater precipice here is literally swarming with pyramid butterflyfish and feisty red-toothed triggerfish that you can actually hear chomping their teeth, as they charge your mask and regulator valve. The triggers aren't the only species fierce about protecting their territory, however. Anemonefish can be downright belligerent, rushing your mask and slapping your ears with their tails if you spend too long peering into their habitat.

Large schools of silver jacks also whirl and dance along the sheer drop-offs and whitetip sharks can usually be found cruising the walls as well. Unfortunately, a long, hot Indonesian spring had pushed the water temperatures to nearly 28°C (82°F), and the sharks had sought cooler waters in the depths below. Bunaken also boasts the occasional whale shark sighting.

Unexpected macro

To be sure, most dives in Bunaken are wall dives, and the volcanic crags are absolutely covered with large corals and colorful fish, but that's not all the protected group of islands has to offer.

On our third day, Kate asked our guide, John Kanoneng, if there were any good spots for macro. John just smiled and said in his thick accent, "Any dive is good for the small lens. You bring macro, I show you." And he did,

Bunaken

CLOCKWISE FROM LOWER LEFT: Whip coral shrimp; Ornate ghost pipefish pair; Randall's shrimp goby; Coral crab on sponge; School of jacks

in a big way.

As the other divers in our group swiftly drifted along the rock faces in search of more giant sea turtles and rays, we slowly and methodically stopped every few feet, as John searched out ornate ghost pipefish, banded boxers, leaf fish, orangutan and porcelain crabs, pygmy cuttlefish, juvenile puffers, grumpy and stoic scorpionfish and wire corals hiding the tiniest shrimps imaginable—and all this on a single "average" wall dive.

Bunaken sometimes gets short shrift when it come to its microscopic life—being so close to Lembeh Strait where macro photography is considered by some, the best on Earth, doesn't help—but, as John proved again and again, the hawk-eyed guides here will seek out pygmy seahorses, candy crabs, juvenile sweetlips, leaf scorpionfish and a host of other exotic, tiny creatures that make the sheer cliffs their home. It's enough to convince anyone that Bunaken's macro life is world-class.

My personal favorite find was a blood-red electric clam hiding under a rocky overhang. The rest of our group had passed by the area rather swiftly, not finding anything special besides a large purple sea fan. But John led us into a small cave and methodically searched the rocks and dark cracks until he spotted the jumping arcs of electricity zipping across the glowing edges of the creature's shell.

Hundreds of species of nudibranchs thrive along these walls as well. "Nudi hunting", as it commonly referred to, can actually get quite addicting, and each time we spotted a new and bizarre color combination hidden among the corals, we flashed happy hand signals and big smiles.

So, if you happen to hear another diver telling you Bunaken is all wall dives and the macro life is lacking, please, please, pleeeeeeeease don't listen. There is abundant and varied macro life hiding along those volcanic cliffs, and if you slow down just a little and allow the guides to help you, Two Fish will make a believer out of you.

Topside treasures

Monkeys at Manado. A stone's throw from Manado Harbor sits the Tangkoko National Forest, a small rainforest reserve that includes three mountains: Mount Tangkoko (1,109 meters), Mount Dua Saudara (1,109 meters) and Mount Batuangus (450 meters). It is here, hiding among the dense flora of the island's volcanic peaks, that one can often view the endangered tarsier monkey—

Decorator spider crab

Flowerrs in Bunaken's village

the world's smallest (and possibly most adorable) primate. Only the size of a tennis ball, these little primates are a nocturnal wonder, foraging for geckos and small insects among the hardwood trees, their enormous, saucer-shaped eyes and soft velvety fur gleaming in the moonlight.

Tarsiers are the only monkeys in the world that are completely carnivorous, eating nothing but small animals and insects. They accomplish this with incredibly acute hearing and unmatched eyesight, as well as strong legs and elongated feet and fingers that allow them to pounce on and hold prey while hunting.

You also may be lucky enough to encounter a small group of Celebes crested macaques—small, jet-black monkeys with long muzzles, high cheek bones and a long tuft of hair on the top of their heads. These primates, known as *yaki* to the locals, are endangered as well, but conservation efforts are helping.

One group in particular, known as Save the Yakis has made great strides in educating villagers and adding environmental protections. Unfortunately, Celebes can be devastating to local crops, and farmers view them as pests. The interaction has thinned the population significantly, and deforestation has robbed this species of much of its natural habitat.

Village life. Life on a remote island is pretty quiet, so if you're looking for a place to get wild after a day of diving, Bunaken probably isn't the place. But the slow and easy atmosphere is exactly what I liked most about our stay.

Kate and I took a leisurely walk around the island and visited the main village. Here, you can find friendly locals sipping cold drinks, napping on shaded porches or tending to their land. Children chase small pigs and goats or gather in groups to play tag or kick a soccer ball around the narrow streets.

In the center of the community lies Bunaken village's splendid and majestic Protestant church, its Gothic spires and peaked eaves towering above the palms. It was Easter the day we visited, and the pews were filled with well-dressed villagers singing hymnals, chanting psalms and fanning themselves in an attempt to keep cool.

The island, like much of Indonesia, is a mixture of Christians and Moslems who, unlike many parts of the world, seem to get along just fine. This was somewhat of a shock to me at first. Living

Children of the local village

Bunaken

The majestic Protestent church in Bunaken's village is dwarfed by the volcano, Manado Tau, in the background. Rising 600m above sea level, its lush slopes of coconut palms gathers pillows of clouds

YOU FOUND A WHAT?

In case you haven't heard of the famous coelacanth, let me give you a brief introduction.

This prehistoric fish is truly a living fossil. Its body and behavioral habits have hardly changed in the last 400 million years, The coelacanth, known to the locals as raja laut (king of the sea) is one of the most mysterious and enigmatic fish in the ocean and was believed to have gone extinct 80 million years ago.

However, in 1938 a live coelacanth was found off the coast of South Africa. Not surprisingly the scientific community was astounded and suspected that the Comoros Islands were the only area left that was home to these ancient fish. Turns out they were wrong again.

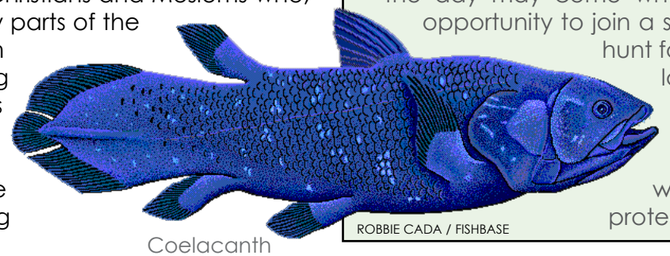
In 1997, a couple honeymooning in Manado (eight miles from Bunaken Island) saw a coelacanth for sale in a local fish market and reported the finding to researchers. Several months later, in 1998, another coelacanth was caught in the Bunaken Marine Park by two local fisherman, and two more were filmed underwater in 1999 by researchers in the same area.

Scientists concluded after examining the second catch, the fish was not one of the South African coelacanths, but a separate species of its own. Since then, four more coelacanths have been caught in the waters around Bunaken, and the Indonesian government seems to be cooperating with research and conservation efforts to study and safeguard the ancient fish.

Currently, very little is known about the coelacanth, other than the fact that they usually hide in deep caves during the day and feed along the coasts at night. But that may be changing.

In October of 2000, a team of experienced trimix tech divers located a small school of the coelacanths at a depth of just over 100 meters off the coast of South Africa.

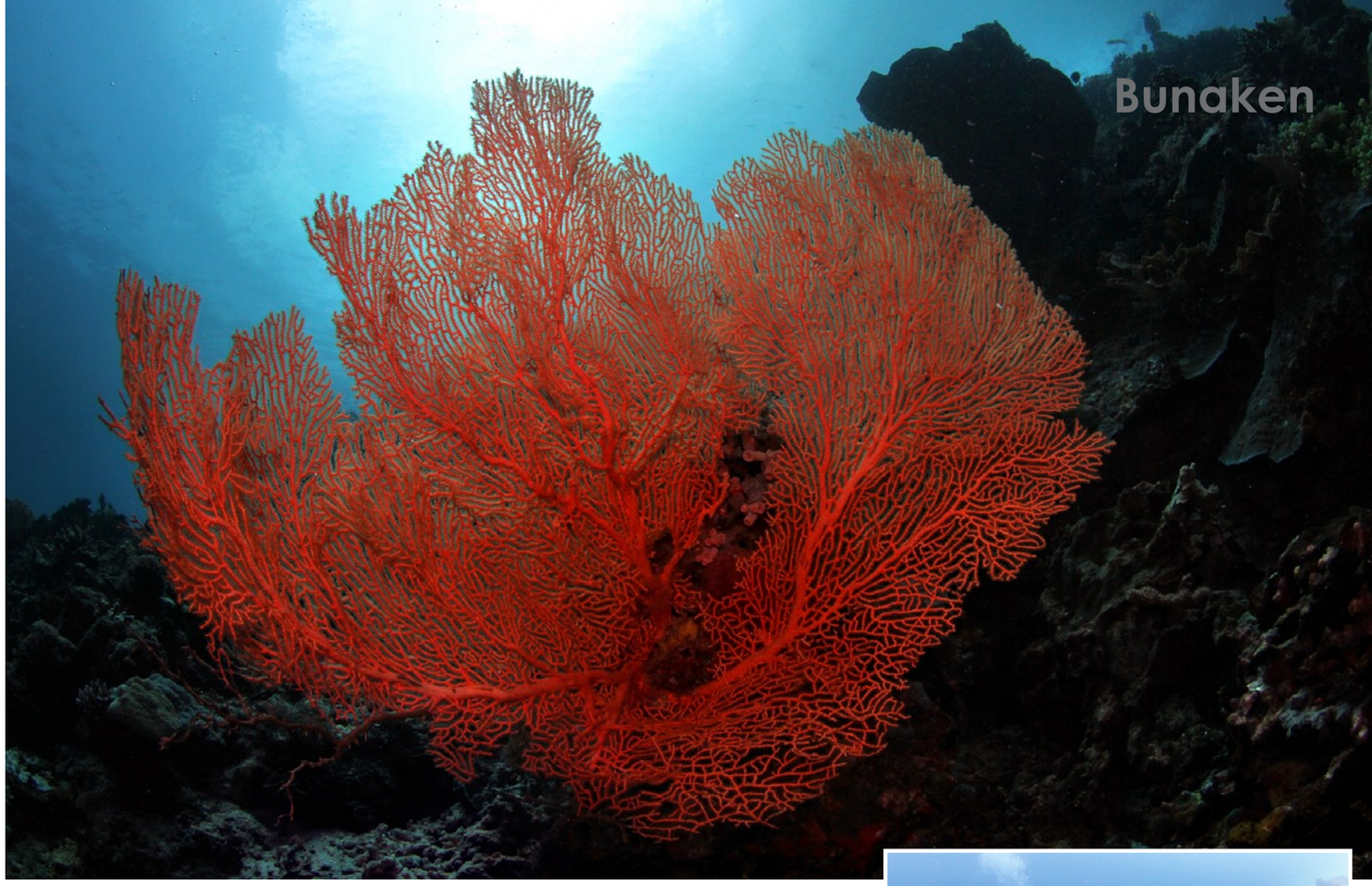
Now, Two Fish has started their own technical dive operations in the marine reserve. So, the day may come when you have the opportunity to join a special group and hunt for the elusive coelacanth and other bizarre creatures in the deep and unexplored waters of Bunaken's protected sanctuary. ■



Coelacanth

ROBBIE CADA / FISHBASE

Wall with billowing red soft coral, author Kelly LaClaire hovers in the background, Mantahege Island



Large red gargonian sea fan and large colony of staghorn coral (right), Mantahege Island

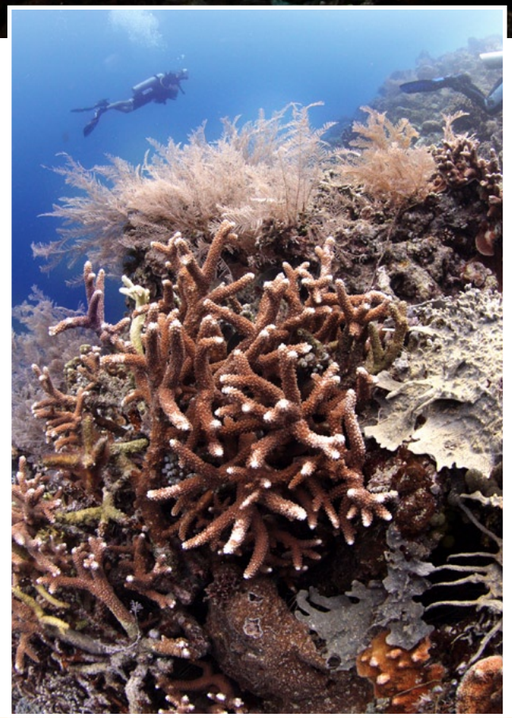
in the United States, I am used to the constant, bitter hostility between these two groups. If more people could come here and see these two sects living alongside one another peacefully, with almost no animosity or resentment, it might just change some thinking back home and around the world.

But perhaps my favorite topside activity was lounging around the Two Fish common area, visiting with friendly folks after a sun filled day of diving. Each night, after enjoying homemade satays, fresh fish selections and spicy noodle dishes, several guests would gather around the softly lit cabana for a cold bottle (or three) of Bintang beer while the divemasters sat nearby playing guitar and singing under the stars.

We made many friends there, sitting under a brilliant moon sharing the day's dive adventures, swapping travel stories, telling one another about the lives we led back home. One couple hailed from New Zealand, another from Spain, and many others from far reaching locals across the planet.

When I sit down to write articles about my experiences, I always smile widest when I look back on these moments. There are few things better than learning about the world from good conversation with fine people.

It was on one such evening that one of the guests asked us if we had visited Barracuda Point. Kate and I looked at each other with wide eyes and simultaneously leaned forward in our chairs, our interest seriously piqued. "What's that?" we asked.



Barracuda Point

The next day we were up early and headed out towards Mantehage Island, several miles north of the resort. Mantehage is just one of many islands in the marine park that, due to their distance from Bunaken, are far less visited than the main islands. Each trip is an all day, three tank affair and a bit more expensive, but the remote waters and relative lack of divers make the surcharge well worth it.

After about an hour, our captain shut off the engine and gave one of the greatest dive briefings I've ever heard.

"This is Barracuda Point," he said. "We only have one shot at this. Everyone is going to get in the water, and the boat will go ahead of us and try and find the school. When they do, we will hear rapid banging, and then we're all going to swim like hell! If we do this right, you are all going to see a huge swarm of giant barracuda. Sound good?"

Everyone on the boat nodded feverishly.

"Okay, then. Let's go!"

Ten minutes of hard swimming later, I was in agony. My lungs were on fire and my calves were cramping with every kick. I had just decided to give it up and surface when we finally saw the massive school. At least three hundred giant barracuda were swimming in a lazy tornado near the steep drop off.

All the pain disappeared instantly. My lungs no longer burned, my legs didn't seem to be tired at all. My attention, which had previously been focused entirely on my protesting body, had shifted wholly to the sight before me.

I took two deep pulls on my regulator and then my breathing levelled out. I'd never seen anything like this before.

Our guide put out his arms, telling us to stop. He didn't want to spook them. The

Barracuda ball at the surface; Diver Markko doing a technical dive (top left); Diver over coral garden (left)

Bunaken

CLOCKWISE FROM FAR LEFT: Mangroves at Two Fish; The dive guides of Two Fish on deck; *Chromodoris annae* and *Halgerda batangas* nudibranchs; Sunset silhouette of village church; Yellow feather star on barrel sponge

school moved out a bit into open water but slowly drifted back towards the coral, getting within touching distance of Kate and I.

I'm not embarrassed to tell you my heart rate quickened considerably. I wasn't too worried; I'm an experienced diver, and I have been in similar situations, but still, these were barracuda, and damn big ones. The average fish was around two meters, some even larger, and I knew what these aggressive hunting machines could do if they decided to strike. Most of them eyed us suspiciously as they passed—a few baring their teeth just to let us know that this was their territory—but none broke away from the pack to investigate us further.

A few moments later, Kate pointed to our left and another school, this one bigger than the first, moved in and began circling the area. The two groups moved like slow, underwater cyclones along the rocky walls, coming together for a brief moment in a great double helix and then breaking away from one another to sweep the rock face again in wide, deliberate circles. It was one of the most beautiful sights I've ever seen underwater, and I didn't want the dive to end.

The show lasted 20 minutes before the barracuda decided to head down to deeper waters. Our little group followed them a few meters into the blue, watching as they slipped down into the depths below.

On the surface, a loud chorus of whoops rang out. The whole group was pumped and no one restrained their emotions. Each one of us had just experienced one of those rare dive encounters we knew may never come again, and we were far too excited for inhibitions.

Kate looked at me, eyes bright and filled with laughter. "You know..." she said, "I really love scuba diving."

Yeah. Me too, Kate. Me too. ■

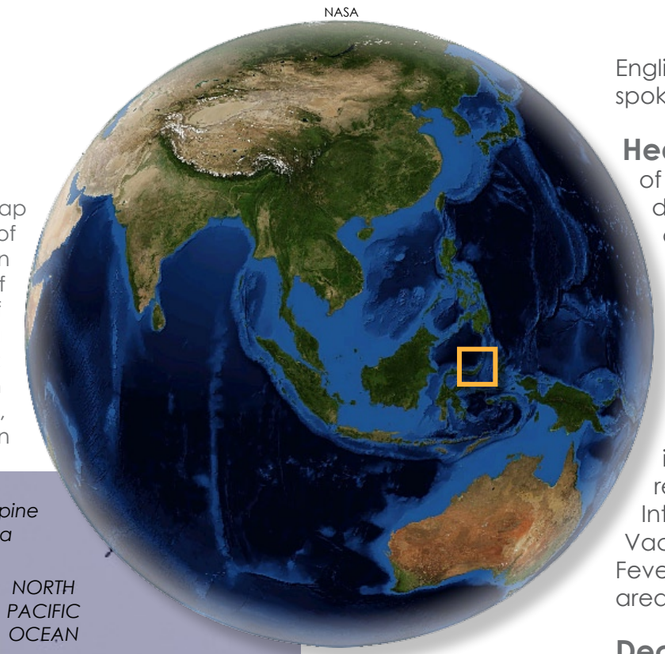
Assistant editor Kelly LaClaire and underwater photographer Kate Clark are cousins based in Portland, Oregon, USA. They share a passion for worldwide travel, experiencing new cultures, and friendly competitions to see who can last the longest on a single tank of air—so far, Kate is the undisputed champion.

SOURCES: SULAWESI.COM, WIKIPEDIA.ORG

fact file

Bunaken, Indonesia

SOURCES: U.S. CIA WORLD FACTBOOK, NORTH-SULAWESI.ORG, D. SILCOCK



RIGHT: Global map with location of Bunaken
BELOW: Location of Bunaken on map of Indonesia
BOTTOM RIGHT: Porcupinefish with cleaner wrasse, Bunaken

History Moslem merchants from Persia began visiting Indonesia in the 13th century and established trade links between this country and India and Persia. Along with trade, they propagated Islam among the Indonesian people, particularly along the coastal areas of Java. In 1511, the Portuguese arrived in search of spices after their conquest of the Islamic Empire of Malacca. They were followed by the Spaniards. Both began to propagate Christianity and were most successful in Minahasa/North Sulawesi and Maluku, also known as the Moluccas. However, it wasn't until the arrival of the Dutch in the early 17th century that Christianity became the predominant religion of North Sulawesi. From 1942 to 1945, Japan occupied Indonesia. Shortly before Japan's surrender in WWII, Indonesia declared its independence. However, it took four years of often brutal fighting, sporadic negotiations, and mediation by the United Nations before the Netherlands finally agreed in 1949 to transfer sovereignty. Strife continued in Indonesia's unstable parliamentary democracy until President Soekarno declared martial law in 1957. Soekarno was removed from power following a fruitless coup in 1965 by alleged Communist sympathizers. President Suharto ruled Indonesia from 1966 until 1988. Suharto was toppled in 1998 following a round of riots, and in 1999, free and fair legislative elections took place. Indonesia is the world's third most populous democracy, Government: Republic. Capital: Jakarta.

Geography Located in Southeastern Asia, Indonesia is an archipelago situated between the Indian and Pacific Oceans. Coastline: 54,716km. Terrain consists primarily of coastal lowlands, with interior mountains on larger islands.

Climate Tropical, hot and humid, with more moderate climate in the highlands. The water temperature is normally 28-29°C (84-86°F) year round, with an occasional "chilly" 27°C (82°F) spot. Most divers use 1mm neoprene suits. However, some people prefer 3mm.

Environmental issues Challenges include industrial waste water pollution, sewage, urban air pollution, deforestation, smoke and haze due to forest fires. Logging—the rainforests within the combined West Papua/Papua New Guinea land mass are second in size only to those of the Amazon, making it 'the lungs of Asia'. In 2001, there were 57 forest concession-holders in operation around the country and untold other forest ventures operating illegally. Mining—tailings from copper, nickel, and gold mining are real threats.

Economy A vast polyglot nation, Indonesia has experienced modest economic growth in recent years. Economic advances were made with significant financial reforms. In 2009, when the global financial crisis hit, Indonesia fared well compared to its regional neighbors. It was one of the only G20 members posting growth in 2009, alongside China and India. However, the government still faces ongoing challenges of improving the country's insufficient infrastructure, labor unrest over wages, and high oil prices affecting fuel subsidy programs.

Currency Indonesian Rupiah (IDR). Visa cards, Euros and U.S. Dollars (large bills issued after 1999) are widely accepted. ATM machines in tourist areas offer the best exchange rates, Travellers cheques are becoming quite difficult to use except at banks. Exchange rates: 1EUR=12,723IDR; 1USD= 9,737IDR; 1GBP=15,127IDR; 1AUD= 9,972IDR; 1SGD= 7,908IDR

Population 251,160,124 (July 2013 est.) Ethnic groups: Javanese 40.6%, Sundanese 15%, Madurese 3.3%, Minangkabau 2.7%, Betawi 2.4%, Bugis 2.4%, Banten 2%, Banjar 1.7% (2000 census). Religions: Muslim 86.1%, Protestant 5.7%, Roman Catholic 3%, Hindu 1.8% (2000 census). Note: Indonesia is the largest Muslim country in the world. Visitors are encouraged to respect local traditions and dress modestly. Internet users: 20 million (2009)

Language Bahasa Indonesian is the official language, plus English, Dutch and local dialects are spoken. In tourist areas, English, Spanish and German are spoken.

Health There is a high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A and E, and typhoid fever, as well as vectorborne diseases such as chikungunya, dengue fever and malaria. Check with WHO or your dive operator for prophalaxis recommendations. Larium is not effective. Bring insect repellents containing DEET. International Certificate of Vaccination required for Yellow Fever if arriving from infected area within five days.

Decompression chamber
Manado: Malalayang Hospital
tel: +62 0811 430913
Makassar: Rumah Sakit Umum Wahidin Sudirohusodo
tel: +62 0411 (584677) or 584675

Travel/Visa/Security
Passport valid for six months beyond intended stay is required. There is a Visa-On-Arrival for 35 countries including USA, UK, most European and Asian countries. It is US$25 for a stay of up to 30 days. Although there is an active independence movement in Papua, tourists have not been impacted.

Web sites
Indonesia Travel
www.indonesia.travel/en

turtle tales

Edited by
Bonnie McKenna

Longline fishing off Costa Rica continues killing sea turtles

At the end of October 2013, the group, Widecast, found dead green sea turtles along the Pacific cost of Costa Rica attached to longline fishing hooks, nylon strings and rope.

The 70 dead green sea turtles were found near the Murcielago Archipelago, in the northwestern province of Guanacaste.

"It is not difficult to conclude that they were caught by longline fishing devices," said Wildcast Costa Rica director Didiher Chacon. "Last week, we had reports of mahi mahi in the area, and behind them usually comes the longline fishing fleet."

In January 2013, 280 dead sea turtles were discovered in the Gulf Dulce, in the southern Pacific area of Costa Rica. Veterinarians discovered inflammation and damage to the turtles' respiratory systems, leading them to determine the turtles had drowned after being snared in nylon nets and fishing lines.

Wildcast's campaign in Costa Rica is called "Yes to sustainable fishing." The campaign aims to inform the public about turtle deaths due to fishing bycatch. They also hope to obtain signatures calling for technical, administrative, legal and socio-economic measures to ensure sustainable fishing practices.

"With this campaign, we intend to ask the government to regulate longline fishing, which includes eliminating the use of live bait and prohibiting that type of fishing in areas with large turtle populations," said Wildcast administrators.

The petition also calls for fines for those who leave unsupervised fishing gear out at sea and increased fines for snaring sea turtles as bycatch. ■

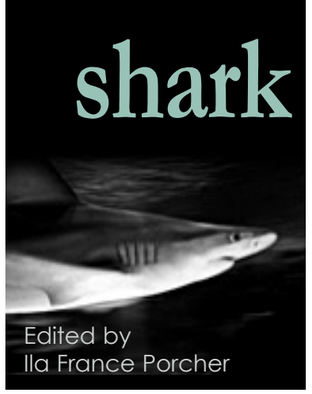
FILE PHOTO: KATE CLARK

Indonesian village turns to traditional law to protect sea turtles

Seacology has funded a new sea turtle guard post near Pelilit Village on Nusa Penida Island that will help villagers keep sea turtle nesting areas from poachers. The guard post will be staffed according to tongayah, the system of obligatory volunteer work for village members.

In Pelilit, conservation rules for this beach and for the nearby forest are enforced by traditional laws known as awig-awig.

Though awig-awig isn't official Indonesian law, the consequences for breaking its rules are severe. If caught, the fine can be as much as 100kg of rice, and village members can be forced to make a public plea for forgiveness. Breaking the rules multiple times can lead to expulsion from the village. ■



Edited by
Ila France Porcher

Hunted Out of Fear
Close to Extinction

Text and photos
courtesy of Rohan Perkins

The shark is an apex predator that has been on this earth for over 400 million years—a predator that, through the media and our deep-seated fears, has been systematically targeted and hunted throughout the world's oceans, pushing many species close to extinction.

"Four hundred million years to perfect—30 years to almost destroy." This simple, yet apt phrase from the Shark Education, Awareness and Survival program (SEAS) in Malaysia describes the situation that shark populations are in worldwide. It is the phrase that Scuba Junkie Mabul Resort on the east coast of Borneo has been using over the last seven years when talking passionately about the area in which they take people diving on a daily basis, and about the sharks that they have been trying to protect in the area over that time.

The fact is—contrary to popular belief and misconceptions—sharks are relatively shy and hesitant animals. Even with the millions of interactions that happen with sharks around the globe daily, there are only around five to seven human fatalities a year.

However, due to misunderstanding and human nature as well as the current rate of targeted fishing and by catch, we may see species of shark, such as the now globally endangered hammerhead, become extinct in the very near future.

I have had the privilege to be underwater for thousands of hours with these beautiful and enigmatic creatures, and I believe that this must not happen. It is time we started to see these creatures as the beautiful and ecologically vital creatures that they are. It is time that our attitudes towards them change, and that the protection and education begins.

The reefs of Sabah, Malaysia, exhibit some of the most biodiverse marine ecosystems in the world, from corals to large rays and the top predators—sharks. Over the last 11 years living and diving in Southeast Asia, I have yet to come across a place as unique as this. But there are problems here, like any other place in the

shark tales


ENIRO

world. We still have many shark species here, including the very rare hammerhead shark, and currently, these species are not protected.

Sharks, which have been part of the ocean's ecosystems since long before the dinosaurs roamed the Earth, are at risk of extinction because of increased industrial fishing and demand for shark fin soup in the past 30 years. It is estimated that one in five of every shark species is classified as 'Threatened with Extinction' by the IUCN—a conservative estimate, as there is insufficient data on almost half of all shark species to determine their population status. With estimates of anywhere from 70 million to 200 million sharks being killed annually, the state of their future is in serious jeopardy.

These statistics are worrying enough when talking about losing entire species, especially those which are a joy to see when diving. But sharks, as apex predators, are key to regulating the ocean ecosystem. They maintain a balance in populations of prey species by removing diseased or old animals. Remove the shark, and the health of the ecosystem suffers. Disrupt ecosystems, and the health of the ocean as a whole suffers.

The scale of the problem can be daunting. It is a global problem, and it is at a critical stage. Action is needed now, not just at the international and governmental level, but also at a local and grassroots level. Areas of ocean known for their shark populations and marine biodiversity become even more important in circumstances such as these. This is what has inspired us to take action to protect the sharks and rays of Sabah, Malaysia.

The importance of Sabah

The waters of Sabah lie within the coral triangle—a roughly triangular area of the tropical marine waters of Indonesia, Malaysia and Papua New Guinea—that is recognized as a centre of high marine biodiversity. The iconic Sipadan Island—one of the top diving destinations in the world, which was made famous by Jacques Cousteau—lies within Sabah waters.

The area is vitally important for marine conservation in general, with Sipadan itself being a prime example of what can be achieved with appropriate action by authorities. The intercession of the Malaysian government in 2005 to declare Palau Sipadan a Marine Protected Park brought together marine conservation and recreational diving in an effort that drastically reduced the negative human impacts on the island and preserved this island 'jewel' for future generations. Such protection being extended to a wider area of the Sabah region would bring untold benefits, especially for shark conservation.

There are around 63 species of shark and 68 species of ray currently confirmed in Malaysian waters—including rare species such as hammerheads, eagle rays, devil rays and manta rays. Populations and sightings of whitetip reef sharks, grey reef sharks, whale sharks, blacktip reef sharks and silvertip sharks are common.

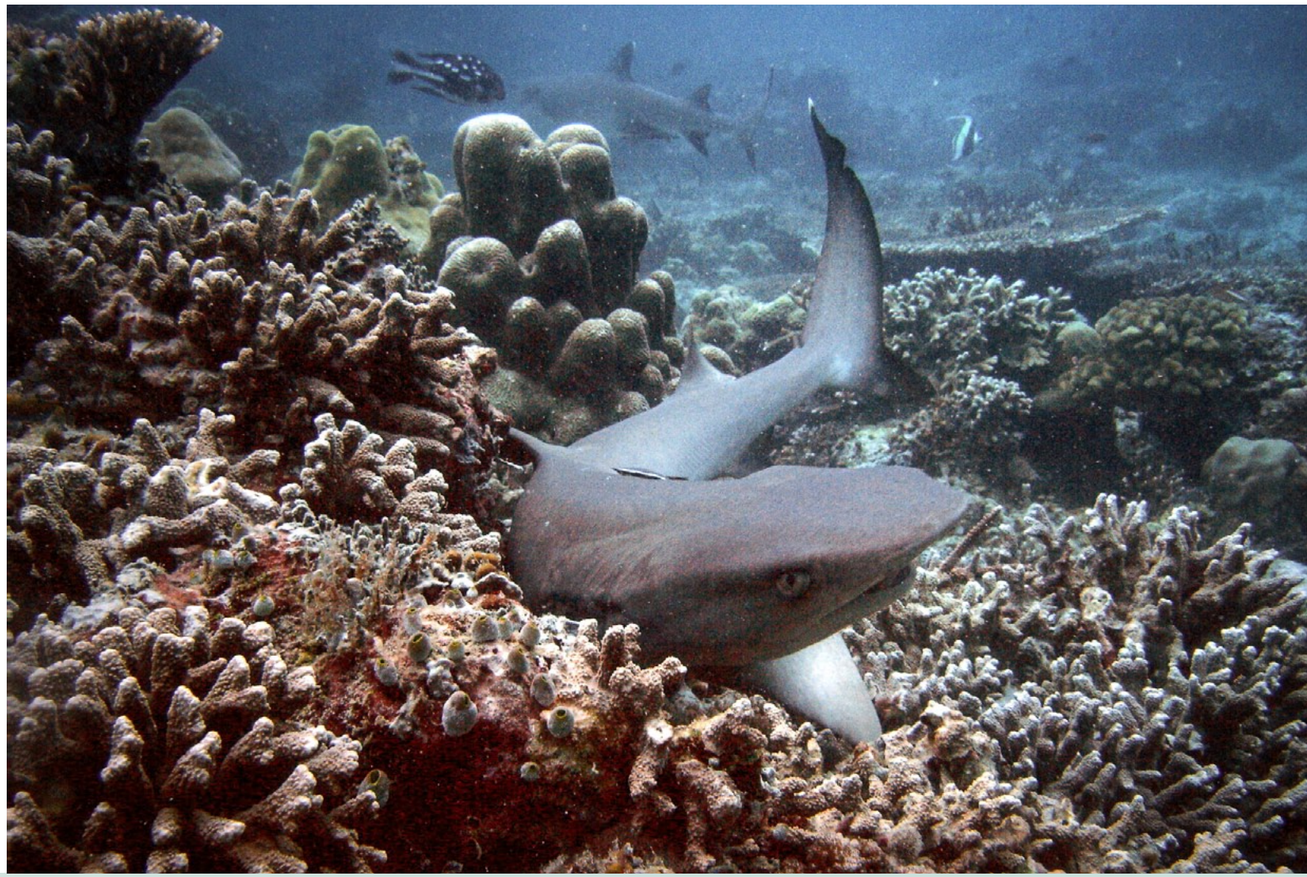
We still have these species here, unlike many other places I have dived in Southeast Asia, where most of the large fish species have

With estimates of anywhere from 70 million to 200 million sharks being killed annually, the state of their future is in serious jeopardy.

simply been wiped out. If we protect them, we will not only protect the species and health of this marine environment, but we will also save a significant long-term economical resource, which will disappear if the area is allowed to be indiscriminately fished. Ironically, if that happens, it will take the increasing, sustainable tourism industry with it, so it will become a 'lose-lose' situation.

We are lucky to see some very rare species in the Semporna region. Recently, schooling devil rays have been seen at Si Amil, numbering well over 100. Both great and scalloped hammerheads are sighted at Sipadan. Populations of hammerheads have crashed by up to 89 percent in some areas—making those sightings crucially important for species recovery. A personal incentive for getting shark conservation really moving in this area was guiding at Sipadan and seeing hammerheads there.

There is nothing quite like spotting what you know is an endangered animal, showing it to your divers and seeing their reaction. I have seen both scalloped and great hammerheads at Sipadan, but the joy of seeing them turns



to worry when I know that outside of Sipadan, these migratory species have no protection.

The extensive mangrove system around Semporna presents a prime pupping ground for some sharks. Sharks, which grow slowly, mature late and produce few young over long lifetimes, are exceptionally vulnerable to over-exploitation and slow to recover from numbers depletion, so they need secure areas such as these more than ever.

We first helped write a proposal for shark protection back in 2009. This was done with the local communities and the environment in mind. We cannot simply waltz in and remove livelihoods from local communities. If we are to get protection of such species as sharks and large rays, we must work with the communities and integrate them into the inception and creation of the sanctuary. Without them, we will fail, and without a sanctuary both the sharks and the local communities will suffer in the future. We are looking at long-term, alternative, and sustainable livelihoods, and that is what a well managed diving industry in the area can bring.

Considering the dire straits of shark and ray populations worldwide, the situation begs for an extended protected area for the region—imagine if the success story of Sipadan was replicated for the entire area!

Problems in paradise

However, both Malaysia (ranking, 10) and Indonesia (ranking, 1) are in the top ten shark fishing nations in the world, most of which is exported for the shark fin soup industry. Of the 14 species prevalent in the finning industry, many are found within the Sabah region—these include both the scalloped and great hammerhead sharks. In Semporna, fishing has always been the dominant economic activity in the region and the way that most people in the area traditionally earn a living. Shark fishing, in particular, is a lucrative business, as one fin can be worth at least US$100, in an area where the monthly salary is considerably lower in other vocations. The act of finning and discarding shark bodies is less prevalent, but sharks are targeted for their fins with the bodies sold for as little as 2-5rm in local markets.

Part of the problem has been that many people in the region see only the individual, upfront value of the shark fin, and do not realize the greater importance of sharks in the ecosystem in general, or see the vast revenues that shark diving tourism can generate year after year in many countries where protection is in place—in the millions of dollars per year. It necessitates a change in attitude, or a change in perceptions, about sharks. Just as many western countries need to move away from the highly sensationalized 'shark attack!' perception of sharks, and shark conservation efforts in those areas focus on changing those perceptions, so efforts in this area centre around solid, financial incentives for leaving the sharks in the ocean.

Generating a change of mindset is not only geared towards business incentives. The people of Sabah are lucky to have such an amazing area on their doorstep. But rarely does this passion come to the fore, nor do people from the area get the chance to be actively involved with conservation issues. It is not apathy—just lack of opportunities.

Tourism is a relatively new industry in this area, on any scale, but is an alterna-

Pair of eagle rays

tive that could financially support and compensate such protection of these species. People are just concerned about putting food on their table; the method is of less importance.

Think global, act local —on the ground support

The problems facing us here in Sabah are not unique by any means, however, Sabah itself is a unique area. Whatever actions are taken here will have great impact, and as the dive industry brings significant income into the area, what influence our industry has can be used to great effect. The success of Sipadan Island Park is a key example of what can be achieved.

When S.E.A.S was first started, our key aim was to inform and challenge established perceptions of sharks. Some divers and guests would still hold the highly fraught 'sharks are dangerous' mindset, and would not be aware of the greater problems of shark conservation or their numbers worldwide.

We wanted to challenge this mindset—make people see sharks for the wonderful animals that they really are, in terms of biology, their occurrence in Sabah and their contributions to the ecosystem.

We carried out a series of presentations and talks to this effect, with great success. The more we told people about sharks, how important they were, and how unique this area was, the louder was the call to protect it.

In addition, we began a programme of talks and lectures in local schools on shark and turtle awareness. Children and teenagers present an amazing opportunity for changing established mindsets and attitudes.

Our aim was to provide opportunities for people to learn more about their home, its environment and the unique ecosystem they have on their doorstep as well as to provide children and teenagers with opportunities to get involved.

We sent local divemasters and instructors to the schools, with resounding success—we have been invited back not only to speak about conservation issues, but with interest for people wanting to become divemasters and work in the sustainable tourism arena.

We have spearheaded the call for a Semporna shark sanctuary (SSS) with local and international support and over 50,000 signatures on an online petition for the creation of the SSS, which brought a lot of international focus and interest in the area. Most recently SEAS joined with the Marine Conservation Society, Scuba Zoo, Tropical Research and Conservation Centre, WWF and Malaysian Nature Society to form the Sabah Shark Alliance.

The state and federal governments, as well as Fisheries, Sabah Parks and the Wildlife Department, have been some of the most understanding and pro-active partners anywhere I have been. They are in a very difficult situation, trying to protect the livelihoods of millions, as well as their amazing abundance of wildlife.

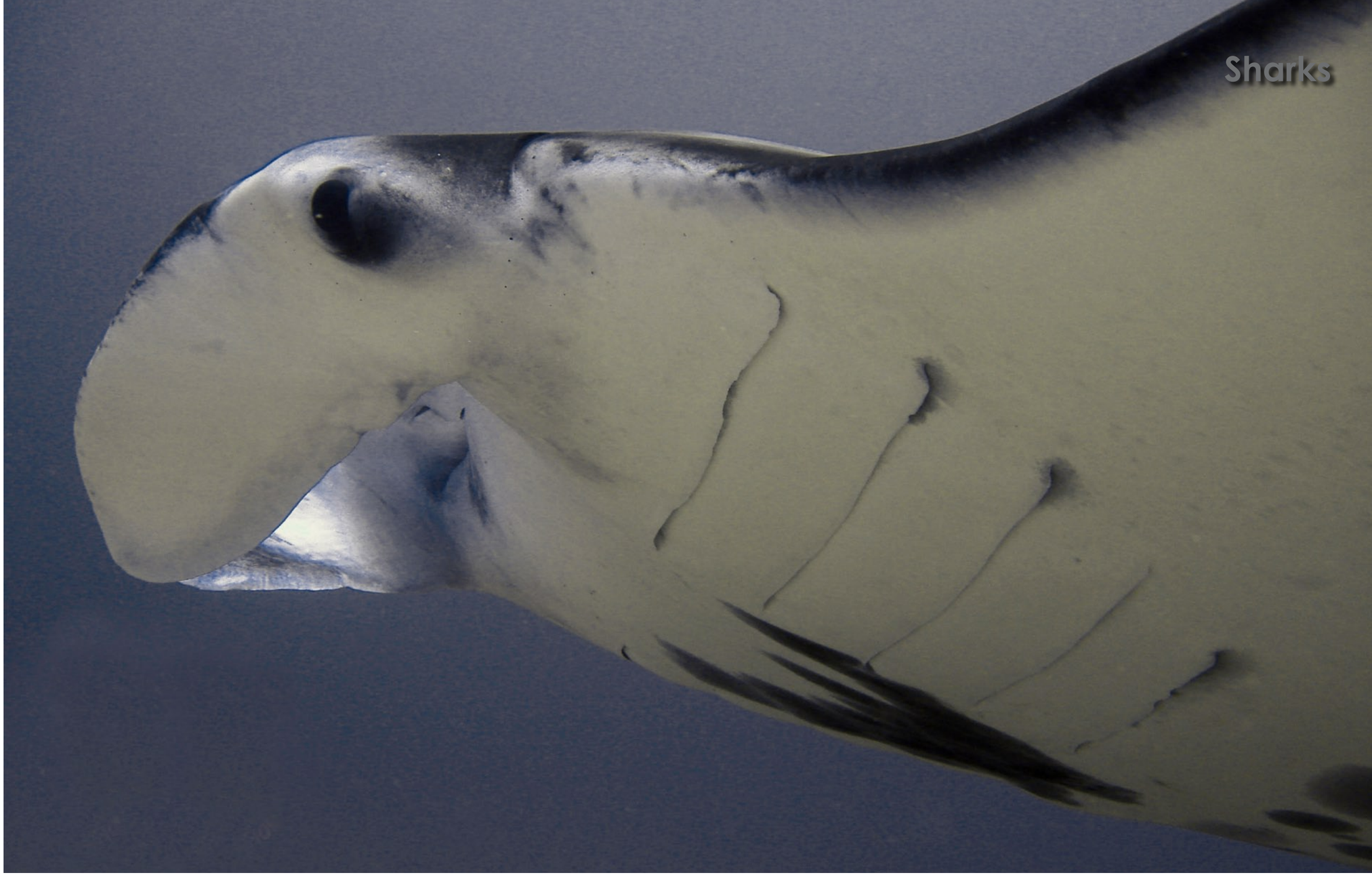
Most recently, open forums with fishermen, stakeholders, business owners, and environmentalists have been held, to discuss the need for more research and more protection of these species, possibly in the form of sanctuaries. It is a difficult task for all involved but one which I believe all believe is attainable.

The business of protecting sharks

A key to getting high level backing for the Semporna Shark Sanctuary—or shark conservation in the Sabah region—has been providing an alternative, reliable, financially sound alternative to shark finning and fishing in this area. Governments realize the importance of sharks in ecosystems and conservation efforts in general, but it is easier for them to establish and support plans when there are sound financial and economical incentives.

Established shark sanctuaries, such as Palau, the Bahamas and the Maldives, all realized this, and the sanctuaries were created af-

Hammerhead shark



Detail close-up of manta ray

ter carrying out detailed reports on the financial benefits of establishing shark sanctuaries in the region. A detailed report was carried out for the Semporna region in 2012 titled, *The economics of shark diving in the Semporna Region, Malaysia* (Vianna, G. and Meekan, M., 2012).

The report found that in total, the diving industry contributes US$34 million in business revenue to the region, and US$7.8 million of this is directly attributed to shark diving (26 percent of total dive revenue). Tax revenue to the government from shark diving totalled over US$1.5 million. The estimated community income from shark diving was over US$1.4 million. Protection of sharks in the Semporna region would result in the loss of approximately US$122,000 for the shark fishing industry—a mere two percent of the income generated by shark tourism.

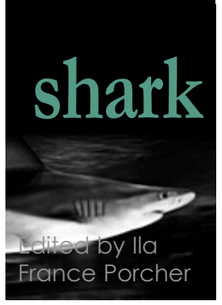
The estimated annual revenues that could be collected through a park fee (used to enforce the proposed sanctuary) would be US$943,000 to US$1.5 million. The estimated annual revenues that could be collected through a park fee and used to generate alternate jobs for local fishermen amounts to US$781,000 to 1.2 million (Vianna, G. and Meekan, M., 2012).

The idea of a sanctuary is to work with the government and the communities to create a future for the area and its people, with more research and scientific studies to help answer such relevant questions as:

- Are Semporna's shark and ray populations stable? If not, why?
- How important are extensive mangrove systems in Semporna region?
- Do we need more protection or research regarding these areas and why? And so on.

We believe that this drifts between the lines of humanitarian, environmental and moral issues. At the heart of it, we must learn to live harmoniously with the natural world, and the people that rely on it for their future as well as maintain and manage tourism responsibly. This kind of integrated community and environmental work can provide the key to the future of this beautiful area and its amazing wildlife. ■

Rohan Perkins is an PADI IDC Staff Instructor, Resort Manager, Reef Check Eco Trainer and Shark Conservationist based at Scuba Junkie Mabut Resort in East Sabah. As the Environmental Project Manager at Scuba Junkie, he has has lectured on sharks and sea turtles for guests, governments, universities and dive expos. Along with Richard Owen and Tino Herrmann, Perkins has been the driving force behind projects such as the Semporna Shark Sanctuary, the Mabul Turtle Hatchery and countless reef and marine conservation projects as well as local community initiatives and educational programs throughout the area over the last nine years. Between the three, they have over 30 years experience working in Southeast Asia, thousands of dives with sharks and rays, hold degrees in marine biology, geological science and earth processes as well as certifications in reef and coral monitoring, water treatment and other conservation disciplines. For more information, visit: ***Scuba-junkie.com***



Sharks are vital to coral reef recovery

A team of researchers led by Jonathan L.W. Ruppert has found evidence that the fishing of sharks from tropical reefs affects the ability of the coral to recover from disasters.

The severe and continuing depletion of sharks from tropical reefs is expected to have serious ecological consequences; yet, just what form those consequences will take is not so easy to determine.

Coral systems regularly undergo cyclic changes due to storms, hurricanes and bleaching events—some of which take decades to complete—and this cyclic nature can complicate assessments of the consequences of shark fishing.

To avoid these difficulties, the scientists compared two separated ecosystems along the northwestern shores of Australia. The sharks of Scott Reef are fished by Indonesia, while nearby Rowley Shoals are in a protected area.


ILA FRANCE PORCHER

Blacktip shark over damaged coral reef

Since both groups of shoals and atolls were in various stages of recovery from bleaching and storm events, the two regions permitted a direct comparison of similar coral ecosystems, with and without shark removal.

The researchers found that the loss of sharks had a significant effect on the populations of the fish inhabiting the coral. In the absence of sharks, smaller carnivorous fishes were more numerous, and this effect was the same on damaged and undamaged reefs. In contrast, the numbers of fish that feed on plankton and coral varied according to changes in the coral habitat, rather than whether or not sharks were present.

Startling finding

The startling finding was that the numbers of herbivorous fishes were significantly reduced on the reefs where the sharks had been killed. Herbivorous fishes graze on the algae that grows on dead coral, and as a result, they are more numerous when natural disasters have resulted in coral death. The feeding activities of the various types of herbivorous fishes keep this algae at a minimum and help the coral to regenerate. The team found that the loss of sharks resulted in fewer herbivores, both in the damaged and the undamaged reefs.

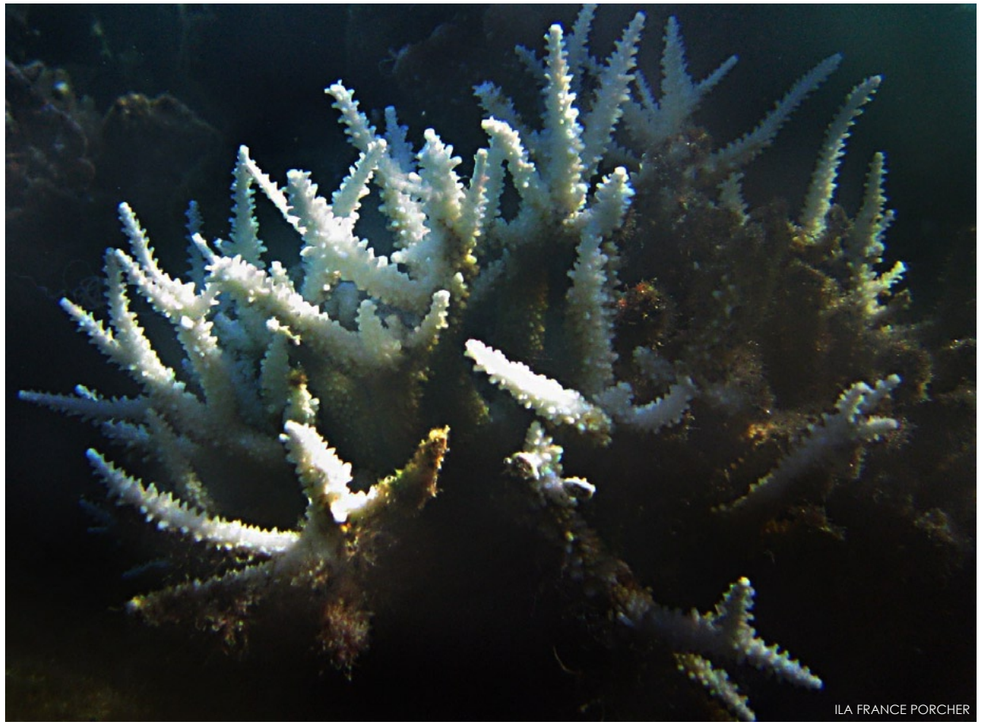
The scientists are unsure why shark loss resulted in the presence of fewer herbivorous fish in the coral reefs and believe that it is due to an ecological cascade effect propagating down the food chain. But whatever the mechanism may prove to be, the presence of sharks is revealed as vital to the regeneration of coral reefs in the wake of destruction.

In addition to natural disasters, increasing numbers of human settlements and their burgeoning population are putting more pressure on these fragile ecosystems through climate change, pollution and habitat destruction. As a result, reefs often suffer multiple stresses. Therefore, maintaining healthy populations of reef sharks should be an important goal in plans to ensure not only the health but also the resilience of coral ecosystems. ■

SOURCE: PLOSONE.ORG


ILA FRANCE PORCHER

Blacktip shark on reef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Bleached coral