

# undercurrent

*The Private, Exclusive Guide for Serious Divers*

October 2011

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## *Spoilsport, Great Barrier Reef & Coral Sea, Australia*

*something for everyone, even snorkelers*

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Dear Fellow Diver,

The third dive of the day started at the far north end of Osprey Reef. We backrolled off the RIB and drifted south at 80 feet in a swift current. The yellow soft coral on the wall reminded me of Peleliu, in Palau, and the eight of us continued on past cascading plate corals, while two white-tip reef sharks patrolled within camera range. Ahead of the pack, I spotted a gray reef shark below me at the edge of the deep drop off, below 31-percent nitrox depth. I signaled to my partner. No, wait, three sharks. No, five, uh, 10, hang on a second here. I dropped to 100 feet and continued counting until I got to 24 grays all facing into the current, swirling and twisting in the breeze. Two hammerheads were farther out, waiting to feed on the current's abundance.

The day before, the crew orchestrated a shark feed here at North Horn. We had all sat in a depression in the wall at 50 feet and waited, while the gray and white tip-reef sharks waited somewhat less patiently, circling the rock. A metal trash can was lowered from the RIB and tied off by divemaster Cleo, who was wearing a mesh glove. Inside, two tuna heads on a short chain were connected to a styrofoam ball. A rope was used to pull the lid off the trash can, the ball popped up with tuna and voila, instant pandemonium. After a big run-up, it was all over in a few seconds --like sex. (The only silver-tip of the trip was sighted at a distance, never coming near enough to feed.)

Today, we learned what they did when the kitchen was closed. The drift ended at the feeding station, where a couple of potato cod, a Napoleon wrasse and two more white-tips were hoping for



A Resident of Cod Hole



handouts. On the way to my deco stop, I passed a dozen great barracuda, a school of small spotted darts on the surface and a couple more gray reefs under the Spoilsport.

Diving in the Coral Sea can be as good as that in Papua New Guinea. Healthy, colorful corals, swarms of fish, sharks on almost every dive and the chance to see something big. Unfortunately, out of seven days, the boat only spent two in the more distant Coral Sea. The first and last three days of the trip were inside the Great Barrier Reef, where the diving is very good but not of the world-class caliber Coral Sea. Mike Ball Dive Expedition's website lists a three-day Fly-Dive Cod Hole trip, a four-day Fly-Dive Coral Sea trip and a seven-day Coral Sea Safari itinerary, noting that on the fourth day, "Guests on the Fly Dive option may join this Coral Sea Safari at this halfway point." Well, the guests do join the

Coral Sea Safari, but the rest of trip is inside the Great Barrier Reef.

Spoilsport sails out of Cairns every Thursday. Boarding is at 6 p.m. after a meet-and-greet with owner Mike Ball at a restaurant near his office. After we strolled down to Trinity Wharf, the crew greeted us dockside and escorted us to our cabin, where our luggage was waiting. I unpacked shorts and T-shirts, stowed the bags underneath the beds and went aft to the spacious dive deck to set up gear. Each diver is assigned a seat with a milk crate gear box beneath it, and an 80 cu-ft. aluminum tank. Each seat had a number, and a plush, numbered towel was waiting on the rack just above the tanks. Safety sausages were provided to those who didn't carry their own, and they even threw in a Mike Ball souvenir water bottle with each diver's name on it. Water coolers at the end of each rack were always filled, and we were cautioned to stay hydrated.

## A Tale of Three Fees

I'm really not a gearhead. I don't have rebreathers, diver propulsion vehicles or big camera kits. But my dive buddy and I do travel with regulators, multiple computers, back plates, wings, lights, several cutting tools, safety gear, first aid kits, layers of rubber, backup masks, spare parts and towels. Like I said, not gear heads.

Thus when we found ourselves at the Jet Star counter in Cairns en route to Sydney with two dive bags, a full-sized suitcase, two carry-on rollies, a daypack, three pieces of aboriginal art, a handbag and a Prada tote (the latter is a subliminal transmission to the airlines to nail us for the excess baggage fees), the clerk's eyes widened.

"Just here for the weekend," I said.

"Right. We'll overlook the dive bags even though they're 27 kilos each, but the suitcase is excess and it's 28 kilos, so at \$15 a kilo, that will be \$420."

The better part of valor being discretion, I stepped to the rear and let the ladies duke it out. Wheedling and cajoling

didn't work, nor did a little woman-to-woman "Oh, come on now." The tab was still \$420. Then my Partner's MBA degree kicked into high gear.

"How much is a seat to Sydney?"

"\$150," was the reply.

"I'll buy the ticket, and the suitcase goes."

"Umm, I'll have to check with Andrew." Jet Star is a code-share with Qantas, and Andrew, who worked for Qantas and turned out to be a thoroughly likeable lad, trotted over.

"Andrew, these people have a \$420 excess bag fee, and they want to buy a ticket for the extra bag for only \$150."

"What airline did you arrive on," Andrew asked us.

"Qantas."

"Well, then the fee is charged per bag, and it's only \$40."

Problem solved. Fly the flag.

-- D.L.

I had selected a standard cabin with two twin beds. The Club cabin features bunk beds. The two windowless budget cabins also has bunks, and shares a head and shower. At time of boarding, a premium cabins with twin and queen beds was still available for an upcharge. There's room for 24 divers, but we only had 14.

The cabins are in good shape, the mattresses fair, and the heads clean and functional. Towels can be replaced when desired, and the linen is changed half-way through the trip. The air conditioning worked fine for me, but condensation fell into a drip pan beneath the unit, and when the ship rocked during an overnight crossing, I got doused with cold water, clearly not conducive to a good night's sleep. All told, there were five nighttime crossings, and two of these lasted all night. August is the dry and windy season, and the winds made this big catamaran rock 'n roll, but none of this affected the diving.

An all-night crossing found us at Cod Hole, which seems to get featured at least annually in Sport Diver or Scuba Diving. I dropped down 86 feet to a sandy bottom with scattered coral bommies and 100 foot visibility. The big Maori wrasses and Queensland groupers (they're also called cods) are no longer fed by divers, which is wise (years ago, hard-boiled eggs killed one of them), so fewer populate this spot. But the ones we saw were huge, unafraid, and offered great photo ops. At a cleaning station, one of the larger residents with his mouth open made me wonder if I could see back to last Thanksgiving. The reef had nice stone corals, long nose and pyramid butterflies, bird wrasses, coral rock groupers, some pink anemone fish, a few Moorish idols, pennant bannerfish, and a beautiful armina nudibranch. All in all, a beautiful Pacific reef for a checkout dive. After a reasonable surface interval, we made a second dive to see the big beasties, and this time a white-tip reef shark cruised through.

My buddy and I used nitrox. While the crew refilled tanks in their racks and capped them, it was a diver's responsibility to analyze the mix, note it on the tank's label and re-attach the first stage. By doing this between dives, we avoided the rush for the three analyzers when briefings were called. Trip director Kerrin Jones, whose personality reminded me of a young John Cleese despite his Kiwi ancestry, diagrammed each reef on a white board and noted the position of the boat, current, wind, probable critters, potential issues such as depth, and then asked for a show of hands for guided dives with divemasters Cleo or Shea. Giant-stride entries could be made from the rear center of the dive deck with a six-foot plunge, or we could walk down steps both starboard and port directly to the sea. Exits were made by ladders at these steps, and there was always a smiling crew member there to take our weights and fins, log our depth and time, and ask us to sign in.

By the end of the first day, my new merino-lined 3mm suit wasn't doing the job in the 73-degree water. Next day, I added a 3mm core warmer, and instead of adding weight, I graduated to a 100 cu-ft. tank (no extra charge), and thus I was warm and neutrally buoyant. My partner wore a 5mm suit and hood, and had no complaints. Some folks wore 5-mm shorties, but they came from chilly countries like Sweden, Germany, Belgium and Holland. Another American couple and a lone Kiwi rounded out the group, and all were experienced divers with good skills.

The Spoilsport is a well-run operation. A continental breakfast was served at 6:30 a.m., first dive at 7 a.m., followed by a hot breakfast while the boat moved to another site. The second dive at 10:30 a.m., surface interval time, third dive at the same site, lunch at 1 p.m. while the boat moved, fourth dive at 3 p.m., then the night dive at 6:30 p.m. at the same site as the fourth dive. The good-humored crew

## *Spoilsport, Australia*

Diving ( <i>experienced</i> )	★★★★1/2
Diving ( <i>beginner</i> )	★★★★★
Snorkelling	★★★★
Accommodations	★★★★
Food	★★★★★
Service and Attitude	★★★★★
Money's Worth	★★★★

★ = poor      ★★★★★ = excellent  
*World Scale*

## Lest We Not Forget Our Fellow Divers

October 8, 2012 is the tenth anniversary of the tragic sinking of the *Wave Dancer* in Belize. The disaster took the lives of 17 members of the Richmond Virginia Dive Club and three Belizian crew members. The boat was lashed to pilings in southern Belize when hurricane-driven surge capsized it. While the guests should have been ordered ashore, they remained on the boat and went down with it. You may read several significant stories about the tragedy and subsequent lawsuits by searching for “*Wave Dancer*” and tragedy” at [www.undercurrent.org/search](http://www.undercurrent.org/search). For a moving piece that appeared October 2 in the *Richmond Times*, go to: [www2.timesdispatch.com/news/2011/oct/02/tdmain01-survivors-recall-17-divers-lost-in-01-bel-ar-1351908/](http://www2.timesdispatch.com/news/2011/oct/02/tdmain01-survivors-recall-17-divers-lost-in-01-bel-ar-1351908/)

had enormous enthusiasm for the diving, and performed a final check of each diver before entry. A lookout with binoculars and a radio was posted on the sun deck for the duration of each dive, and they paid serious attention to their task.

The professionalism didn't stop at the dive deck. Chef Ragini's fare was terrific.

Breakfast included eggs,

pancakes, hot and cold cereal, bacon, sausage, mushrooms and freshly baked breads and muffins. Lunch always featured a hot soup made from scratch, fresh salad and a different international cuisine every day -- Mexican tacos and fajitas, Italian pastas and pizza, Asian noodle dishes and stir fries. Dinners were after the night dive. Two main courses -- steak, chops, a hearty beef stew, or baked fish -- accompanied by fresh veggies, potatoes or rice, and fresh bread. Dessert might be cake, fruit crumble, chocolate mousse or ice cream. Meals were served family-style or buffet on the Saloon Deck, and crew ate with the guests. Red and white Aussie wines were poured at no cost. An adequate bubbly from Down Under could be had for AUD\$12 a bottle. Beer was \$5. A small selection of liquor was available for \$5 a shot, and soft drinks were \$1.50. After meals, there might be a reef ecology talk given by photo pro Laurence Buckingham, an ad hoc slide show by one of the guest shooters, or a discussion of the next day's dives.

Fairy Grotto at Osprey Reef was our first wall dive. I dropped to 98 feet to view a blaze of red sea whips. Down deep, soft corals beckoned while gray reef, nurse, and white-tip sharks swam within camera range. At the top of the reef, blue, yellow and pink tabletop acropora coral were the background for long-fin bannerfish, disk butterflies and Moorish idols. To accurately report this dive, I must add, embarrassingly so, that I had failed to properly connect my power inflator, and I dropped to 125 feet before I got my buoyancy controlled. My wife stayed at 98 feet, calculating my potential insurance payout.

Admiralty Anchor offered lots of swim-throughs between mounds of algae-free hard coral. I took the guided dive with Kerrin to see the anchor lodged in the reef tunnel, then departed to do my own thing, hovering close to snap photos of sleeping white tips. Diving freedom is the rule here, and on shallower dives we were welcome to go for 60 or 70 minutes. The day after the shark feed, we dove Fast Eddies while the sun rose in a clear sky and slowly revealed the colors of the soft corals on the wall. Up top, a green turtle swam through the hard corals, while fire dartfish and blue-head tilefish hovered over the sand.

On the fourth night, dinner was a barbecue with steak, shrimp and kangaroo (well, their skin is used in running shoes). Guests were encouraged to wear their loudest party attire, and wine flowed. But the party was a mid-week farewell because many divers we had gotten to know well were leaving the following morning on a wave-skiing flight from Lizard Island (lodging there runs up to AUD\$1,500 a night) back to Cairns. So after the three remaining seven-day trippers spent the morning chasing goannas around the island's national park, we were joined by new guests going on the three-day tour. Gone were the old experienced hands; our new companions included newbies, openwater students, snorkelers and non-diving spouses. The next three days were spent inside the Barrier Reef, and included a return visit to Cod Hole.

At Lighthouse Bommie, the resident olive sea snakes engaged in a mating dance that left them entwined like a caduceus. A patient green turtle posed for close-up photos while a black and blue *phyllidiidae* nudibranch prowled the coral. Underneath the boat, I off-gassed while communing with at least 100 big-eye trevally. At Pixie Wall

and Pixie Gardens, curious cuttlefish masqueraded in staghorn coral and raised questioning tentacles to touch my partner's miming fingers. A night dive (with lights provided) was ho-hum, except for the giant trevally that used the light beams to hunt unsuspecting reef fish. Apparently thankful, the trevally chased the boat back to Cairns while I spent time on the bridge chatting with competent Captain Peter Jackson.

While we talked about things like fuel consumption and maintenance, I considered the Mike Ball Dive Expeditions business model. The reality is we are living in tough times. Ball maintains a large staff of great people, and needs to put guests on the boat, hence the four-day and three-day sections of a seven-day trip. I wish I had been better informed about the itinerary so I would have known upfront that not all divers would be at the same level of experience. But our sport does need new divers to keep these boats floating. Once upon a time, I went to Fiji with only 25 dives under my weight belt, so I find it hard to be too critical of Ball for what he must do to keep his business going.

On our last night out, we enjoyed another barbecue. We had picked up first mate "Pirate" Pete Conlon at Lizard Island. Pete sang and played guitar while the shrimp and 'roo sizzled on the barbie and the sun sank into the Pacific. A great time was had by all. But the best times were on the Coral Sea. The worst time may have been on the overnight trip back, which was into such strong winds that Kerrin handed out barf bags. I will not disclose whether I kept mine tucked away.

-- D.L.



**Divers Compass:** My Qantas coach flight included food and beverages, good video entertainment, and they offered express passes that whisk passengers with tight connecting flights to the head of the security and customs lines . . . If you arrive on an international Qantas flight, you can save up to 60 percent on domestic flights to places like Ayers Rock and Alice Springs, and save a bundle on excess baggage fees (see sidebar on page 2) . . . Economy fares for flights recently priced for November 2011 are \$2,188 from New York and \$1,850 for Los Angeles, and flights during the high-season Christmas holi-

days are \$3,284 and \$2,965, respectively . . . Through March 2012, three-day Fly-Dive Cod Hole trips range from US\$1,500 to \$2,200, four-day Coral Sea trips run from \$1,715 to \$2,950, and the seven-day trip runs from \$2,940 to \$4,485 . . . Reef tax is \$20 per person; nitrox is \$75 for a four-day trip and \$150 for all seven days . . . For rental gear, you pay \$40 a day for a full kit, including Aqualung BCD and regulator, and a 5mm wet suit; new (well, one year old) BCDs and regulators are free of charge for guests in Premium and Standard cabins who need them . . . Website: [www.mikeball.com](http://www.mikeball.com)

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## Turks & Caicos, Grand Cayman, Costa Rica

*plus advice about Mabul diving and your passport pages*

**Left Behind.** Our feature story on Mike Ball's *Spoilsport* shows how well the Aussies count heads. They do so because two American divers were left behind on the Great Barrier Reef in 1998 and were never seen again (the subject of the film *Open Water*). Some American dive operations haven't caught on. On October 2, divers Paul Kline and Fernando Garcia Puerta were rescued by a private yacht when passengers spotted them clinging to a buoy off Key Biscayne. Seems as if they were on a dive with RJ Diving Ventures of Miami Beach, which had taken 30 people, including Kline and Garcia, out to dive. When Kline and Garcia surfaced, however, their dive boat was nowhere in sight. "We were in shock," Kline, 44, told the *Miami Herald*. "We could easily have died." The two said they clung to a fishing buoy for two hours until they were spotted around 6 p.m., as it was getting dark. "We could see two divers with all their equipment and an inflated red tube," the yacht's captain Elie Trichet told the *Herald*. "You could notice a strong feeling of relief." Kline said, "I wasn't gonna give up. We managed to find a buoy and we hung on so that if

somebody came to look for us, we'd be in one spot, because I don't know which way the current is taking us. If it's taking us out to sea, that'll be a completely different story." The Coast Guard is investigating.

**Your Passport.** Many times, we have heard from readers who have not been admitted to a country -- usually Indonesia -- because they had too few empty passport pages, usually fewer than four. Jerry L. Tuttle (Phoenix, AZ) tells us that in Port Moresby, Papua New Guinea, "I was caught with too few empty pages in my passport and was close to being denied entry. After pleading, logic finally prevailed, only to be faced with a cancelled flight and an overnight in Port Moresby." If you are pages short (arbitrarily, I think), you face having to fly to another country to get the U.S. Embassy to put more pages in your passport. So take care of business ahead of time. And while we are on the subject of PNG, recognize that the airlines are frequently behind schedule and often cancel flights. Give yourself an extra day or two on each end of your trip so you can connect with your flight home.

**Whale Watching at Salt Cay, Turks and Caicos.** Humpback whales journey through these waters from January through March. Sandy Falen (Topeka, KS) tells us what happened on a trip last February. "Salt Cay Divers runs whale watching trips, where you can enjoy viewing whales on the surface and possibly have an in-water encounter. The staff is dedicated to a soft encounter, and won't chase or harass the animals in any way. I was fortunate to see numerous whales breaching, tail slapping, 'waving' their pectoral fins, and approaching our boat with what appeared to be curiosity. A mother whale and calf swam right past our boat, and a lone whale literally swam right under us. I was able to enter the water, and snapped a couple of terrific shots as 'Moby Dick' cruised slowly by me and the other snorkelers. That short interlude made for a lifelong memory." Falen stayed in the "Twilight Zone" cottage: "A two-bedroom, one-bath house; simple but lovely, with comfortable beds, ample hot water, ceiling fans, a full kitchen and close proximity to Island Thyme restaurant." Salt Cay, one of my favorites, is a throwback in time, with few people, pretty reefs and good tropical fish life, but it's the winter when the thrills happen. ([www.saltcaydivers.tc](http://www.saltcaydivers.tc))

## The Mysterious Case of the Stolen, Exploding Tank

Russell Vanhorn II, a 23-year-old Iraqi War veteran who fell in love with diving after getting certified during his military service, was preparing for a dive trip in his St. Petersburg, FL, apartment early on the morning of September 11 when the small pony tank he was handling exploded, killing him.

The explosion blew out the front door and windows of his apartment, and sent debris flying 75 feet away, and blowing out some windows of cars parked nearby. The tank was found split down the middle from top to bottom, lodged overhead in what was left of the kitchen ceiling. Luckily, the two other people in his apartment were in separate rooms and were not injured.

A witness getting his morning newspaper told police he saw a bright flash when the explosion happened, suggesting the tank held pure oxygen. But the medical examiner who did the autopsy said it's still not clear what triggered the blast. When investigators reassembled the tank, they discovered that the escape valve, which controls pressure of the gases, was missing, but they found it in the explosion rubble two days after Vanhorn's death. The cause of death was ruled accidental, with the explosion causing severe damage to Vanhorn's side, leg and arm. Also, it has not been determined whether it was air or oxygen in the tank, as the

autopsy showed no signs of a heat-generating type of explosion, like burning tissue.

As it turns out, two of the tanks in the apartment were confirmed as stolen, although police had not yet determined if the exploding pony tank was as well. The Tampa Police Department's bomb squad inspected the tanks and let the air out, but it's unknown if they measured tank pressure or mixes before doing so.

Vanhorn worked as a dive instructor for Scuba West in Hudson, FL, which reported the tanks missing. Scuba West had recently fired him when he stole a dive reel from the shop, and an employee found it in his bag. The *St. Petersburg Times* reports that a Scuba West client reported seeing Vanhorn with the shop's tanks at Eagle Nest, a local cave diving spot, in July. And just before Vanhorn's death, ScubaWest reported some equipment missing, including seven tanks, four dive lights and a regulator, although authorities said there was no evidence yet to charge Vanhorn for all the stolen gear.

The demolished tank was sent to Pinellas County's forensic lab for signs of anything combustible, then the tank will be given to the U.S. Transportation Department, which regulates pressure cylinders, to determine what went wrong.

## Dive Shop Owner Convicted of Killing Wife Underwater is Set Free

We wrote a few big stories about David Swain, a Rhode Island dive shop owner convicted in October 2009 of killing his wife a decade earlier during a dive trip in the British Virgin Islands (see our April 2006 and January 2010 issues). After serving two years of his 25-year sentence, Swain was freed from a Tortola jail on September 29 after the verdict was overturned.

A panel of three judges with the Eastern Caribbean Supreme Court of Appeal found problems with the jury instructions read by a judge during the trial. Swain's defense attorney had argued that the judge did not adequately advise the jury on how to handle evidence from a 2006 civil suit in Rhode Island, in which the jury held Swain responsible for the death of his wife, Shelley Tyre,

and awarded Tyre's family \$3.5 million. The appeals court also declined to order a new trial because of concerns about recalling defense witnesses given the amount of time that has passed since Tyre's death

"I feel elated," Swain told reporters as he walked out of the jail. He said he intends to "breathe a little free air, go for a walk, go home, pick up the pieces and go on."

J. Renn Olenn, a lawyer representing Tyre's parents, held a news conference that same day to say that even though the conviction had been overturned, it didn't mean Swain was exonerated. "No judicial body has declared him innocent, and two different juries have found him guilty beyond a reasonable doubt."

**A Top Dive Shop in Grand Cayman.** If you're in the market for a small, independent dive operation, our readers constantly recommend Indigo Divers. Samuel C. Knoch (Tarentum, PA) went diving with them in June and says, "An excellent dive operation. Owner/operators Chris and Kate Alpers strive to meet all customers' needs. Dive boats are sleek, fast to the site and comfortable. Six divers max, no cattle cars here. The service is personal and high level. Chris mans the still shots, and Kate provides underwater videography services. They are fun-loving people, but always looking out for you on the dives." ([www.indigodivers.com](http://www.indigodivers.com))

**Costa Rica's Pacific Coast.** Divers looking for land-based diving in the Western Hemisphere often overlook Costa Rica's Pacific coast in favor of the Caribbean, but they're missing plenty of big fish opportunities. The water can be cooler and conditions tougher, but the rewards are bigger. Gail Thomas (Austin, TX) went with Aquacenter Diving, based in Playas del Coco, in May and says, "It was a good dive shop. The friendly owner picked me up every day, and on most days, dives started on time, with three to nine divers. One dive was called off after divers were caught at Dirty Rock in heavy current with limited, 30-foot visibility. We returned to that dive site two days later for the best dive of the trip. No memorable coral but amazing schools of tropicals and much larger fish. I often found myself in a school of fish. Lots of mantas, huge morays, white-tip reef sharks measuring four feet long, and turtles. May is the rainy season, but no rain on any of my dive days. However, the water was very choppy most days, rough on entry as we waited to descend, always current and surge once down, and rough getting back into the boat after the dive, but all was worth the effort. Water temperatures were 78 to 80 degrees." ([www.aquacenterdiving.com](http://www.aquacenterdiving.com))

Sandy Falen (Topeka, KS) tried Deep Blue Diving in Puerta del Sol in September and says, "There is almost no coral, and the visibility is considered excellent at 60 feet. However, there is always a lot to see: huge schools of tropicals, eels everywhere, white-tip sharks daily, octopus, lobsters and a veritable pufferfish farm. The dive staff was fun, friendly and always helpful. The water was warm (about 80 degrees), not counting the bone-chilling thermoclines you encounter from time to time. I wore a 3-mm vest under my polypropylene suit, and was very comfortable. Of course, this was the end of the summer; it's very different in the spring. Deep Blue arranged my diving and hotel package, and it's incredibly inexpensive compared to most Caribbean destinations. Hotel Puerta del Sol was perfect: simple but lovely, impeccably clean, with a roomy bathroom that had a large shower and plenty of hot water, a small fridge, coffeemaker, security safe, semi-private veranda, a lovely pool area and a pleasant breakfast daily. There are plenty of good restaurants in Playas del Coco, and pricing wasn't unreasonable. My friends and I spent our last day zip-lining and whitewater rafting, and it was terrific. Randall, owner of Shaman Tours, was our guide and escort. This was a return visit after 15 years, and Playas del Coco has gotten more touristy, with some areas bordering on tacky but overall, it's still a great little town and pretty laid back." ([www.deepblue-diving.com](http://www.deepblue-diving.com); [www.shamantourscostarica.com](http://www.shamantourscostarica.com))

**Mabul, Malaysia.** If Pulau Mabul, a diving area near Sipadan, is on your horizon, be forewarned that the government may soon limit the number of visitors to avoid overcrowding and preserve Sipadan's reef. A good travel agent should be able to plan your trip so you won't find yourself shut out when you arrive. As for the diving, Mike Cavanaugh (Bellaire, TX) reports from his trip last month, "We were expecting world-class diving at Sipadan Island but we did not experience that. The visibility was not good and the currents could be quite swift (a fast drift dive). We did see tons of sharks (white tips, black tips and grey reef sharks). We saw so many turtles that I quit shooting video of them. The schooling barracuda and bumpheads were impressive but hard to capture on video or camera due to the visibility. We have heard many opinions on the best time to dive Sipadan but I'm not sure who to believe, because they are all contradictory. Mabul Water Bungalows was a very well-organized and managed resort. The rooms were nicely furnished and clean. The A/C worked great, and mosquitoes weren't too bad. The food was always good. We stayed at the resort during a slack period so we got to dive Sipadan three days. The other days, we were diving the house reefs at Mabul and Kapalai. Lots of macro things to see at the house reefs but not much natural coral. We saw the largest green turtles and moray eel ever at these two islands. Overall, the divemasters (not sure of their credentials) were all complaining of being overworked, and their lack of enthusiasm was apparent. While they were friendly and courteous, they only wanted to get in and out quickly. The resort has an analyzer for nitrox but no pressure gauge to check the tank. One of the tanks during the second or third day was only 1500 psi and the divemaster dove with the short fill." Well, Mike, aside from the visibility, sounds damn close to "world class."[www.mabulwaterbungalows.com](http://www.mabulwaterbungalows.com)

-- Ben Davison

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## The Painful, Disabling Sting of a Lionfish

### *a reef scientist's firsthand encounter*

It is a typical night dive in Anilao, a province of Batangas in the Verde Island passage off the Philippine island of Luzon. In the beam of our lights, the reef swarms with life, from octocorals to active crinoids and fire urchins. Nocturnal fish forage, while others crouch in niches in the coral to avoid predators. Swimming along the shallow reef are several lionfish, with long white venomous spines. A strong current ebbs west, and we kick sideways downslope in search of pygmy seahorses and sygnathid fish. Carefully avoiding the fish, my dive buddy, a local guide named Peri, drops down the sloped surface of a dive site named Basketballs (there's a court on land nearby). Above us, other scientists drop from the narrow outrigger canoes in search of new species of fish, corals and invertebrates.

We are on a joint expedition with the California Academy of Sciences and Philippines Natural History Museum to document the marine life in this region. In addition to helping with the fish and sharks, I am the team's documentarian. Peri stops at 90 feet in search of the sea fans that host the pygmy seahorses, and I drop down below him, shining my light on the bottom. I am careful to settle onto a spot clear of coral or lionfish; I regularly see the latter beneath ledges during the day, but at night they are out on the reef. Their aggression toward divers and researchers has been well documented, and I have already experienced fish swimming aggressively towards me, displaying their spines.

The red lionfish is a venomous coral reef fish in the family Scorpaenidae, order Scorpaeniformes. This species is native to the Indo-Pacific region, but has become a huge invasive problem in the Caribbean and along the Atlantic coast of the U.S., along with a sister species, *Pterois miles*. It has been speculated that this introduction may have been caused in 1992, when Hurricane Andrew destroyed an aquarium in southern Florida, releasing the fish. In the two decades since, the fish have established themselves as a significant invasive species. A voracious fish with high reproductive success, they have proliferated exponentially. Densities in the Caribbean and along the East Coast are orders of magnitude greater than in their native ranges.

## Have Lionfish Met Their Match?

Initially all but ignored by native predators, the lionfish, an Asian native, may have met its match in the eastern U.S. and Caribbean waters it has been terrorizing. An international research team from the University of Queensland and the American Museum of Natural History reports in the scientific journal *PLoS ONE* that lionfish densities are amazingly low in the Exuma Cays Land and Sea Park in the Bahamas, apparently because the invasive fish has become a favored lunch of the native grouper.

The reefs there have some of the Caribbean's most diverse marine reserves and, as a result of a 20-year fishing ban in the park's waters, huge groupers exist there at high

densities. "Grouper numbers [there] are among the highest in the Caribbean, and we believe that groupers are eating enough lionfish to limit their invasion on these reefs," said research team leader Peter Mumby.

Although previous studies have found lionfish in the stomachs of groupers, Professor Mumby said it was exciting to discover that Caribbean groupers are able to control their numbers, but he adds a cautionary note. "Years of overfishing means that densities of large grouper, like the Nassau grouper, are low throughout most of the Caribbean. If we want groupers to help us control the lionfish invasion, we'll have to develop a taste for lionfish instead of grouper and drastically reduce the fishing of this species."

And that, fellow divers, is one more reason not to order grouper on your next Caribbean vacation.

The invasiveness of the red lionfish is a growing problem for reef ecosystems. They overpopulate reef areas and display aggressive tendencies, forcing native species to move to waters where conditions might be less than desirable. One likely ecological impact caused by *Pterois* could be their impact on prey population by directly affecting food web relationships. Some studies suggest that lionfish could be decreasing Atlantic reef diversity by up to 80 percent. They are voracious feeders, and have out-competed snapper and grouper species already compromised by overfishing. Also, it's likely that the reduction in other apex predators like sharks in the region has relieved natural controls over the fish. The good news is that lionfish have infrequently been found in the stomachs of grouper (see our sidebar), and eradication efforts are underway on reefs in Cancun, the Bahamas and in Florida, including underwater lionfish derbies and even lionfish barbecues. Still, the high fecundity of the species makes control a challenge.

Here in Batangas Bay, the fish are common, but if care is practiced, they are not a significant hazard to our team. I find a pair of *Sygnathid* fish to film, and my attention narrows to the video camera controls and the dance before me, so I don't notice as Peri drifts downstream to another sea fan. The pipefish wrap themselves around each other and I shift in the sand to get a new angle, when suddenly I feel a sharp stabbing pain in my leg. Flashing my light down, I see a large red lionfish scurrying away, spines outstretched. The pain is immediate and intense, and understanding the effects of the venom, I rapidly close up my camera and search for my buddy.

In humans, *Pterois* venom can cause systemic effects such as vomiting, fever and sweating. In some cases, it has been lethal. The effect of the venom is negatively inotropic (weakening the force of muscular contractions), and positively inotropic (increasing the heart rate). At 100 feet underwater at night in a three-knot current and carrying 60 pounds of camera equipment, I feel my heart racing. I am healthy and not worried about heart problems, but this is serious.

No spines protrude through my 3mm wetsuit, but my leg is already painful to the touch. I see the light of my buddy, now 20 yards down current, and I circle my light to signal distress, but Peri is absorbed with collecting. I must kick back up slope, complete my safety stops and try not to lose ground in the strong ebb. I signal that I am surfacing and don't wait for a response. As the pain moves down my leg, I'm concerned about losing muscle strength and ankle control. With a large video camera housing, lights and a weighted tripod, the kick upstream is formidable, and I'm sucking air hard. I ascend kicking parallel to the shoreline to surface as close to the canoe as possible. With potential loss of muscular control of my right leg, I don't want to surface downstream of the canoe and be unable to reach the boat.

Kicking towards the surface, the burning increases, and I make my safety stop moving up current where I can see the lights of the boat. I feel the loss of power in my right leg and loss of flexion in my ankle. The exertion and

pain have caused me to use more air than normal, and my tank is nearing the reserve. Over increasingly painful minutes, I surface and hand up my gear. It's a long wait for the rest of the team, and an even longer ride back to the field station where I receive treatment from Matt Lewin, a San Francisco emergency doctor volunteering his time for the expedition.

I have problems walking on my affected leg, and have lost some muscular control of the right leg. The venom is a heat labile protein, so the typical treatment is to apply a hot pad soaked in water, but the delay means the venom has spread throughout my leg, from my toes to my hip. Matt settles me in and does what he can, which includes hydration and the heat treatment.

By now, touching the affected area is painful, the heat pad is excruciating, and I have lost sensation in my toes. Matt administers an analgesic, and continues to apply hot pads, which I can barely endure. An hour after the sting, my entire leg is burning and my hip, knee and ankle joints are painful. The discomfort causes me to shift and fidget. The intense pain lasts for another few hours, and ultimately subsides to a dull throb. Matt asks if I want more pain medication, but I want to dive the next day so I decide to try to sleep. Overall, it takes me a week to get over the sensitivity in the region. After one month, a red raised welt remains at the site of the sting where the four spines had entered.

We continued to dive over the next two weeks, and many new species of fish and invertebrates have been discovered, but overfishing is heavily affecting this region of biodiversity. In the absence of other predators (we don't see sharks or other large predatory fish), I wonder if the lionfish will fill that niche here and further affect the balance of the reef. Perhaps I will return and find out, but next time, I will definitely keep my eyes peeled for lionfish.

*David McGuire is a scientific diver with the California Academy of Sciences, filmmaker, writer and founder of the nonprofit organization Sea Stewards.*

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## The Evolution of DAN

### *is the Divers Alert Network still fulfilling its mission?*

As we hope you know, we regularly post interesting, unusual diving blogs on our website. The blog post for which we've received the most responses went up last summer when Doc Vikingo asked: "DAN's *Alert Diver*: Lost Its Mission?" Doc's piece tied in with our June 2010 article about Divers Alert Network's monthly magazine, and whether it had turned into a publication long on flash and full-color photos, but short on DAN's mission of helping divers with medical emergency assistance, and promoting diving safety through education and research.

The discussion quickly slipped into a free-for-all, with questions about conflicts of interest and why DAN board members were appointed to head DAN services and products, while cutting staff members and severing long-term ties with Duke University Medical Center. And why does DAN, a nonprofit, need not one, but three, for-profit organizations under its umbrella? Some comments angered at least one DAN board member, and we received a faxed letter from their attorney, requesting that we remove the entire blog. Of course, we refused; after all, it seemed like a healthy discussion that any member-based nonprofit ought to endure. The debate continued into the fall, and though it petered out and now is old news, it's still online at [www.undercurrent.org/blog/2010/05/29/dans-diver-alert-mission-question](http://www.undercurrent.org/blog/2010/05/29/dans-diver-alert-mission-question)

One thing we ourselves noticed was a change in the research and educational materials DAN presented to the public. For years, we relied on DAN's yearly Dive Incidents and Fatalities Reports for "Why Divers Die," our annual multi-article investigation into the factors that led to divers' deaths. The 2008 report was the last one

DAN published. In July 2010, we published an article about DAN's effort to edit a presentation for its fatality workshop diver deaths by *Undercurrent* contributor Bret Gilliam and dive insurance expert Peter Meyer. A senior DAN official told Gilliam his candor could prove embarrassing to dive training agencies and operators who would be at the workshop. Suppress dive research just to let the industry save face? Doesn't sound like proper promotion of dive safety and research.

DAN has had its times of contention and scandal in the past, most notably when it forced Peter Bennett, PhD, DAN's founder and first CEO, to retire, charging him with financial misappropriation and other wrongdoings (we wrote several articles about this in 2003). Was DAN facing another time of instability, cover-ups and running an old-boys' network to the detriment of its original mission, staff - - and members?

We asked DAN for answers. Bill Ziefle, a former DAN board member who now serves as president of DAN Services, current DAN president Daniel Orr, and Nicholas Bird, vice-president of medical services, made themselves available.

*The dive industry's future hinges on attracting new divers - - younger people. DAN's future also depends on it.*

### **Board of Directors or Good' ol Boy Network?**

One accusation brought up in Dr. Bennett's time, and again on our forum, was that DAN was run like an old boys' network, with board members easily shifting to executive roles at DAN for-profits, like Steve Frink taking up the publication of *Alert Diver*, and Ziefle moving over to head DAN Services. Ziegler's response: "One of the board's primary responsibilities is to help recruit and retain a management team that can effectively and efficiently implement initiatives relevant to day-to-day operation of the company. In the case of *Alert Diver*, DAN was looking to improve the quality of the magazine and expand its mission of delivering content related to diver safety and health. When Stephen Frink agreed to become the publisher, he gave up his seat on the board to avoid any conflicts of interest. The board reluctantly accepted Frink's resignation, believing his contribution to DAN would be even greater as publisher of *Alert Diver*." If you're a member of DAN, you have no doubt noticed the radical reformulation of *Alert Diver*. While some people still bemoan the commercialism of the redesign, one must admit that the old *Alert Diver* had clearly become an anachronism, stuck in the '80s.

As for Ziefle, once his term as a board member expired, he was asked to continue serving DAN as president of DAN Services because of his understanding of insurance laws and regulations; his background in finance made him qualified to lead DAN's insurance subsidiaries. Ziefle told us, "Though it's not common to see former board members assume management roles at one of the DAN companies, when it has occurred, any objective review of their qualifications show they were the best suited for the positions. However, the reverse does not occur at DAN. None of the current board members worked for a DAN company before joining the board."

### **A New Take on Research**

What about DAN's annual incident and fatalities report? When DAN reorganized in 2009, it decided to take a different approach on the report, Ziefle says. "DAN's resources focused on planning and hosting the 2010 Fatality Workshop that not only examined fatality case studies, but focused on learning more about the causes of dive fatalities and how to prevent them (the presentations are at [www.diversalertnetwork.org/research/conference/2010FatalityWorkshop/proceedings/index.html](http://www.diversalertnetwork.org/research/conference/2010FatalityWorkshop/proceedings/index.html)). By discontinuing the regular publication of its annual report, DAN is able to stay focused on its research efforts, thereby increasing productivity. It also allows DAN to disseminate its findings in the format most appropriate, whether it's a workshop, conference, online seminar, magazine article, a published special report or any other information distribution methods."

And while *Undercurrent* always found the fatality reports interesting and useful, they largely reported on the medical aspect of fatalities,. One had to extrapolate to understand the fatalities' real causes - - panic, diver error, diving beyond one's capabilities, etc.

Ziefle says DAN has used the recession as “an opportunity to assemble a strong management team for DAN Holdings. DAN also increased resources devoted to activities members tell us they value most, while reducing or eliminating activities less relevant to today’s divers.” Expanded areas include research efforts on issues most important to recreational divers, like a study on Sudafed and the risk of oxygen toxicity. The DAN education department plans a complete reworking this year of its training and continuing education programs to “respond to member needs and advancements in technology and regulations.”

## One Insurance Claim DAN Should Have Approved from the Start

If you’re having reimbursement hassles after filing a DAN TravelAssist insurance claim, press on, especially if you’re talking by phone to the folks “at DAN,” who may actually work at the insurance company TravelGuard. It might even get resolved quicker if you say, “I read about what happened with Chris Newbert.” After nearly two months of back and forth, Newbert got paid in full for his claim, and his case led DAN to retrain TravelAssist customer-service operators, but it also leads to some interesting questions about how well DAN knows the companies it’s outsourcing duties to.

Newbert, a leading underwater photographer, was diving in Lembah Straits last year when his mild cough progressed into chest pains and a fever. A doctor guest diagnosed him with pneumonia and recommended Newbert go home immediately, as there were no medical facilities on the island they were on. Because Newbert carried DAN’s premium “preferred” policy, the resort manager called DAN for instructions, and the TravelAssist representative he talked to agreed Newbert should go home, and DAN would cover the extra travel costs for an earlier departure date. The doctor recommended Newbert fly first- or business-class so he could lie prone during the flight. Newbert already had a business-class seat booked, but due to the airline’s rebooking rules, Newbert would have to buy a similar seat on his desired date for \$4,600. He flew home and made a speedy recovery.

Getting reimbursed was more painful. After submitting his paperwork, Newbert’s claim was denied by Dick Clarke, president of National Baromedical Services, the outside claims consultant DAN uses to comply with insurance regulations. He e-mailed Newbert, “We have reviewed the record carefully, and see no reference to an assumption of financial responsibility on DAN’s part.” DAN was only responsible for getting Newbert to Singapore, where medical facilities were available, not all the way home, so Clarke offered Newbert only the \$350 cost of an evacuation flight from Manado to Singapore.

“There is one additional option,” Clarke also wrote in that e-mail. “DAN may consider negotiating with you to produce something for *Alert Diver* magazine, in exchange for a higher payment related to your travel costs.” Whoa, that does not sound like a proper reimbursement procedure to us. It does sound like Clarke was offering a “scratch our back” scenario to use a celebrity’s skills to DAN’s advantage.

Newbert rejected both options, and kept arguing his claim. After all, the TravelAssist person on the phone said he was covered. Luckily, all TravelAssist calls with customers are recorded, and Clarke finally reviewed the call made from Newbert’s dive resort. After that, Clarke e-mailed Newbert, “We have been able to verify that [the service rep] indeed provided incorrect advice. Consequently, your claim has been approved. We (at least TravelAssist) has taken action to minimize the likelihood of this happening again, but we are approving your claim none the less.”

DAN Services president Bill Ziefle tells *Undercurrent* that after resolving Newbert’s claim, DAN and TravelGuard retrained their customer service staffs “to ensure those taking calls understand DAN membership benefits, as well as the protocols associated with them.” As for the “scratching back” offer Clarke made to Newbert, Ziefle said that was a misunderstanding and that Newbert was wanted as a profile for *Alert Diver*’s regular column, “DAN Was There for Me.” Ziefle said it was because “Newbert’s case involved an evacuation, a misunderstanding of benefits and, in the end, an example of DAN providing service beyond what an insurance company might do.”

Newbert doesn’t buy that, saying DAN is covering up. “The offer Clarke made came in his very first e-mail to me, in which the bulk of my \$4,612 claim was denied! To fit [DAN’s scenario], this offer would have to have been made *after* my claim was settled, and that did not occur until over two weeks later. So the assertion that a misunderstanding was resolved, and that DAN provided service beyond what an insurance company might do, is nothing short of laughable. The fact is, Clarke’s offer was undeniably a quid pro quo for a settlement. He was throwing me a bone, hoping to keep me quiet.” Shortly after DAN replied to our questions about this case, Newbert got a call from *Alert Diver* editor Steven Frink, who said this was the first he had heard of the offer Clarke had made, and “was extremely upset and embarrassed on behalf of DAN.”

Because DAN has multiple divisions, some of them outsourced, it will have to do a better job of overseeing them all, and having them adhere to proper -- and legal -- procedures.

## Adding Some Things, Cutting Others

DAN is promoting its 2011 fundraising appeal ([www.diversalertnetwork.org/development/donations.aspx](http://www.diversalertnetwork.org/development/donations.aspx)), which lets divers determine exactly where their donated funds will go, from direct support of the DAN emergency hotline to sponsorship of an educational webinar. Says Dan Orr, “We wanted to give people a greater choice, and be empowered to direct dollars to where they feel have a greater impact.”

The dive industry’s future hinges on attracting new divers – younger people. DAN’s future also depends on it, and Orr says the for- and non-profit divisions are doing what they can, from supporting the Dive Equipment and Marketing Association’s “Be a Diver” initiative to hiring young people who know Facebook, Twitter, etc. “Getting younger divers is a problem for everyone, so we’re trying to use social media more,” says Orr. There’s a DAN-sponsored video talking up diving and trying to dispel myths that it’s dangerous. Mobile apps for phones are in the works.

Unfortunately, a few things had to go by the wayside: some staffers, leading to a \$1 million reduction in overhead, and DAN’s official ties to Duke University Medical Center (DUMC). When DAN was established as in 1990, its employees were part of the Duke University Medical Center (DUMC). Under an agreement, all employees were leased to DAN, which reimbursed DUMC for their costs, including salaries and benefits. “Over time, the complexities of the relationship became increasingly costly and unmanageable,” says Zieffe. In 2008, the DAN board decided that DAN employees should work directly for DAN, and all DAN-DUMC contracts expired. “But while we continue to work collaboratively with DUMC, we do not work only with DUMC,” says Orr. “DAN has built relationships with the hyperbaric and diving medicine departments at the University of San Diego and the University of Pennsylvania. These affiliations have not only broadened DAN’s reach, they have increased the dive accident case exposure for fellowship physicians in training. Our goal is to increase DAN’s impact on physician education and the quality of service provided to divers -- and that’s the promise we’ve fulfilled.”

DAN still makes some missteps. In August, the state of Connecticut charged it with not properly registering to transact business there. Of the 330 out-of-state firms operating illegally in Connecticut, DAN paid the largest fine, a settlement of \$26,955. And, as you’ll read in the opposite-page sidebar, companies DAN outsources its duties to may deny -- or promise -- financial compensation to DAN members without the proper authorization, making customers angry and tarnishing DAN’s reputation.

However, we see few complaints from divers about DAN medical services, insurance, customer service or other issues. DAN, indeed, has its customers’ best interests at heart. As long as financials are properly accounted for and openly displayed, and no behind-the-scene shenanigans affect the services members pay for, then DAN is doing what it’s supposed to. But as with any organization in which you hold membership, it’s wise to read the annual reports, keep track of member-service changes and additions, and ultimately hold DAN accountable. We do so, because we know that DAN is vital to our industry and for the health and safety of every diver, we need DAN to stay on track.

-- Vanessa Richardson

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## Exercise and Diving

### *pre-dive workouts can protect against decompression sickness*

In the March and May 2004 issues of *Undercurrent*, I examined the estimated risk of decompression sickness (DCS) posed by exercise before, during and after scuba diving. My conclusion: Based on the research at hand, divers should avoid strenuous exercise four hours before and six hours after diving. I also reviewed research showing that a single episode of high-intensity aerobic exercise 24 hours before a chamber dive

## Stay in Shape

A January 2009 study in *Aviation, Space and Environmental Medicine* found that regular divers who had undergone 90 days of physical training evidenced significant reductions in post-dive bubble scores. Interestingly, these scores increased when measured three months after the training ceased. At the least, this reinforces the notion that the physically-fit diver may be at reduced risk for DCS as compared to the out-of-shape diver.

*“Bubble formation and endothelial function before and after 3 months of dive training,” Aviation, Space, and Environmental Medicine, January 2009, pgs 15-19.*

decreased the number of circulating gas bubbles in humans more than fourfold, and reduced the maximum bubble size by a half. Studies on rats showed that strenuous exercise 20 hours before a chamber dive suppressed bubble formation and reduced decompression illness-related deaths in rats, but had no meaningful effect at 48, 10, or five hours prior. This line of inquiry suggests that vigorous exercise many hours before diving may reduce the already tiny incidence of DCS.

Since then, new findings suggest exercising much closer to diving substantially reduces circulating gas bubbles, and thus may have a protective effect against DCS. Clearly, these studies have implications for our prior recommendations regarding wait time between exercise and diving.

For example, in July 2005, researchers in France reported in the journal *Aviation, Space and Environmental Medicine* on 16 divers compressed in a hyperbaric chamber following 45 minutes of running two hours before their chamber ride. Each diver performed two dives three days apart, one without exercise and the other with exercise before the dive. Similar to doing exercised 24 hours ahead of a dive, it was found that running two hours before a dive decreased bubble formation after diving.

Other researchers followed up with a June 2011 study published in the *European Journal of Applied Physiology* that examined the effect on bubble formation of a single bout of exercise one hour before a dive. Twenty-four divers did openwater dives to 100-foot depths for 30 minutes, followed by a three-minute stop at 10 feet. These divers first did a control dive without exercise beforehand, then three days later, they made a second dive after vigorous (but below-maximum effort) running on a treadmill for 45 minutes one hour before immersion. Circulating bubbles were then graded every 30 minutes for 90 minutes after surfacing. Again, the exercising divers showed significantly reduced bubble grades.

Why exercise hinders inert gas bubble formation is unknown, but there are two favored hypotheses. One is exercise increases nitric oxide, which induces relaxation and expansion of capillary walls, making their linings less sticky, so gas bubbles are off-gassed more quickly and efficiently. The second hypothesis is that, rather than altering the nitrogen elimination rate, exercise may reduce the population of gaseous nuclei from which inert gas bubbles form.

The newer findings modify my earlier advice about minimizing strenuous exertion before a dive. Specifically, semi-vigorous exercise up to one hour before may have a protective effect against DCS. In any event, such exercise appears unlikely to be harmful, as micronuclei formed in the tissues as a result of pre-dive exercise are thought to be compressed and squeezed back into solution, making them less of a concern.

As regards high-intensity activity during and after a dive, my advice has not changed. Microbubbles present at those times can only be problematic, i.e., they expand upon ascent, and in sufficient number and/or size, they can precipitate DCS.

In closing, don't forget that these guidance only refers to exercise at the start of each new dive day. Once a dive has been made, exercise before, during or after that dive would be exercise following a previous dive, and not recommended. Also, this guidance does not advocate the avoidance of post-dive activity of all kind. Vigorous, joint-jarring exercise decidedly is a bad idea, and so is taking a nap. Your best protection is mild, gentle-on-the-joints activity, such as an easy swim or walk, following a dive.

-- Doc Vikingo

# Shark-Repelling Magnets for Divers

*they might work, but do you need them?*

Few sport divers think they need a safeguard against sharks. Regardless, various companies have tried to make them, offering specialized sunscreens, chemical sprays, visual tricks and disguises, but with little documented success. But for those divers who want to keep the big boys at bay, magnets may send sharks fleeing. Why? The interaction of saltwater and charged metals produces a weak electrical field. When a shark nears that field, it apparently disrupts its' special sixth sense of electroreception, the detection of minute changes of electricity in seawater.

One scientist studying magnets' effectiveness is Craig O'Connell, a marine biologist working for SharkDefense ([www.sharkdefense.com](http://www.sharkdefense.com)), a research company developing magnetic shark repellents for commercial and recreational use ([www.repelsharks.com](http://www.repelsharks.com)). O'Connell, has had two research papers on his results published in the past year. In the British journal *Marine and Freshwater Behaviour and Physiology*, O'Connell describes how he tested bull and nurse sharks in the Florida Keys by tempting them with two piles of fish carcasses lying behind clay bricks - - one of the sites had barium-ferrite magnets, the other was not magnetized. After keying in on the bait, bull sharks on the magnetized-brick side kept swimming away in frustration (although nurse sharks that swam in from the opposite side easily ate the bait). After discovering the other pile, they fed a number of times from the non-magnetized side.

For a study in Bimini waters, O'Connell traded in bricks for beach nets. Six young lemon sharks were given the choice to swim through a magnetic or control opening in a net-like fence. In the first trial, all six avoided the magnetic region and preferred to swim through the control region fence. But after re-testing three of the sharks that were rested for 24 hours, the magnets no longer affected their swimming behavior, and they often swam through the magnetic opening. "However, these results may not mean that permanent magnets are an ineffective long-term repellent," O'Connell writes in his study, published in *Ocean & Coastal Management*. "[The sharks] may have habituated to the repeated magnetic exposure, although ... it was unclear whether it was due to the stress of repeated testing over a short duration, or due to sensory habituation to the magnetic fields."

## Scuba Diving for Health

We always knew diving was good for the spirit and soul. Now medical researchers believe scuba is good for the health as well, and are testing that thesis out on groups ranging from disabled veterans to breast cancer survivors.

A pilot study of 10 disabled veterans who have suffered spinal cord injuries for 15 years found that diving may help improve muscle movement, touch sensitivity and post-traumatic stress disorder symptoms in people with spinal cord injuries. After the veterans completed four days of dive training in the Caymans (eight out of the 10 passed the course), researchers found an average 15 percent drop in muscle spasticity, an average 10 percent increase in light touch sensitivity, and an average 5 percent jump in sensitivity to pinpricks. And on the mental health side, PTSD symptoms decreased an average 80 percent - - and not all of that could be attributed to the Caribbean dive sites. By contrast, a control group of healthy dive buddies experienced no improvement of any kind.

"What we saw in the water strongly suggests there is some scuba-facilitated restoration of neurological and psychological function in paraplegics," said study co-author Adam Kaplin, a professor of psychiatry at Johns Hopkins University. He believes water may provide buoyant resistance training not found on land, and when in the water, breathing isn't hindered by sitting in a chair. Tissues may benefit from being extra oxygenated from pressurized air, possibly causing improvements in muscle tone and sensitivity.

Also, PADI announced its support of a new study commissioned by Duke University Medical Center to understand the health benefits of diving among breast cancer survivors. Dubbed "Project Pink Tank," the initial research will begin this month with a survey via PADI eNewsletters, *Undersea Journal* subscribers, and PADI social networks. Survey results will be analyzed by Duke researchers to assess activity levels and health of divers who have been diagnosed with breast cancer. The results are expected to be published by Duke in May 2012. To access the survey, which will remain live through January 31, 2012, go to <http://pinktank.org>.

“A lot of species are very different and have predatory strategies, so we can’t say all sharks will respond that way,” O’Connell told *Undercurrent*. He recently tested great whites, and next up are hammerheads and tiger sharks.

But they aren’t foolproof. First, magnets only have a short range. A U.S. patent application filed in 2007 by SharkDefense describes installing Lanthanide electropositive metals into fins, a bracelet and a belt that divers can wear to ward off sharks, but also states that the gear would only repel sharks “within a few inches” of approaching them. Because the magnetic field only deters sharks up to a foot away, you’d need multiple magnets scattered across your body for enough security. What sport diver would do that?

Secondly, you may be in trouble if a shark-feeding frenzy occurs. When sharks are hungry enough, they may continue to pursue something despite an uncomfortable electrical field, says Ralph Collier, founder of the Shark Research Committee and author of *Shark Attacks of the 20th Century*. “If you’re using a baiting situation with dead fish, sharks are aware the fish aren’t alive, so their behavior is methodical and slow moving. But if it’s moving at 30 miles per hour in a predatory attack, and your area of protection is in the middle of that sphere, there’s an excellent possibility that the shark will pass through the magnetic field and strike before it feels the effect. Sharks’ type of behavior and feeding mode has a great deal to do with the effectiveness of magnets. They only work on a limited basis.”

O’Connell disagrees. He says his life was saved by a SharkDefense product, although it had no magnets attached. It was Scuba/Spear MiniCan, an aerosol spray containing the semiochemical repellent shark necromone, literally “shark corpse.” You spray it into the water, shrouding you in the reek of decomposing shark. “We were running an experiment in the Bahamas, which had me surrounded by eight Caribbean reef sharks,” says O’Connell. “They were feeding at the surface, so I was going to swim away, but instead I drifted directly into the center of the feed. Prior to biting, sharks tend to bump the victims, I got bumped several time. One was so hard, I blacked out. Another researcher threw two aerosol cans at me, and one hit me on the head hard, so I woke up. I sprayed, and the sharks were completely gone by the time I was about to get out of the water. The aerosol is quick acting, and will move in the current, but it did save my life.” But we have yet to see this written up in a scientific journal.

He admits magnets may make a greater impact on the commercial fishing industry -- SharkDefense has found a way to magnetize fishing hooks (so sharks won’t accidentally get caught by fishing boats) and beach nets installed around swimming areas.

Commercial divers -- maybe even those who feed sharks for tourists -- may not be deterred by the \$500 average price for SharkShield products. SharkDefense products are much cheaper -- a magnetic ankle bracelet is \$25, a can of aerosol spray is \$15. Given the paltry number of sport divers who get bitten by sharks, we doubt the products will be flying off the shelf. However, if you’re a worrywart, it’s cheap insurance -- if the products work.

-- Vanessa Richardson

**Undercurrent** is the online consumer newsletter for sport divers that reviews scuba destinations and equipment. We accept no advertising.

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**Letters to the Editor/Submissions**

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