

shark tales



Shark feed
in South
Africa

Text and photos by Brandi Mueller

On one of my recent dive trips, a post-diving dinner conversation turned to capturing epic shark photographs. A magazine photo editor was in our group, and I wanted to know how photographers got those perfectly lit, very close shots of sharks, which is typically an animal that is quite shy around divers. He told me shark feeds, or using bait to lure the sharks, is one of the only ways to get sharks close enough for those types of photos. There are limits of light in underwater photography and strobes and video lights only go so far, so getting them to come close is necessary.

There are few places in the world where one can see sharks quite close naturally (without divers changing the natural environment with food) such as the sardine run in South Africa where huge bait balls attract sharks. Being in the right time and place for large migration events, like the hammerheads that pass through the Galapagos, is another opportunity, and

then there is the super lucky dive where a curious shark comes close. But mostly, sharks do not like us. We are big and loud (all those noisy bubbles), and when they see or hear us, they swim away. Sharks have a sensory organ called a lateral line system that allows them to sense movement and vibration in water. We

must sound like a freight train to sharks, and they know we are there long before we ever see them, so we often do not see them.

Enter the shark dive, where bait is used to lure sharks to a specific spot and divers can enjoy the spectacle.* Sometimes, the sharks are actually fed by a trained

dive guide, sometimes a bucket of bait is opened at the end of the dive, or some are not fed at all with a container of bait used only to keep curious sharks nearby. For photographers and videographers, these dives are amazing opportunities to get close to sharks, and here are some tips to get the best photos.

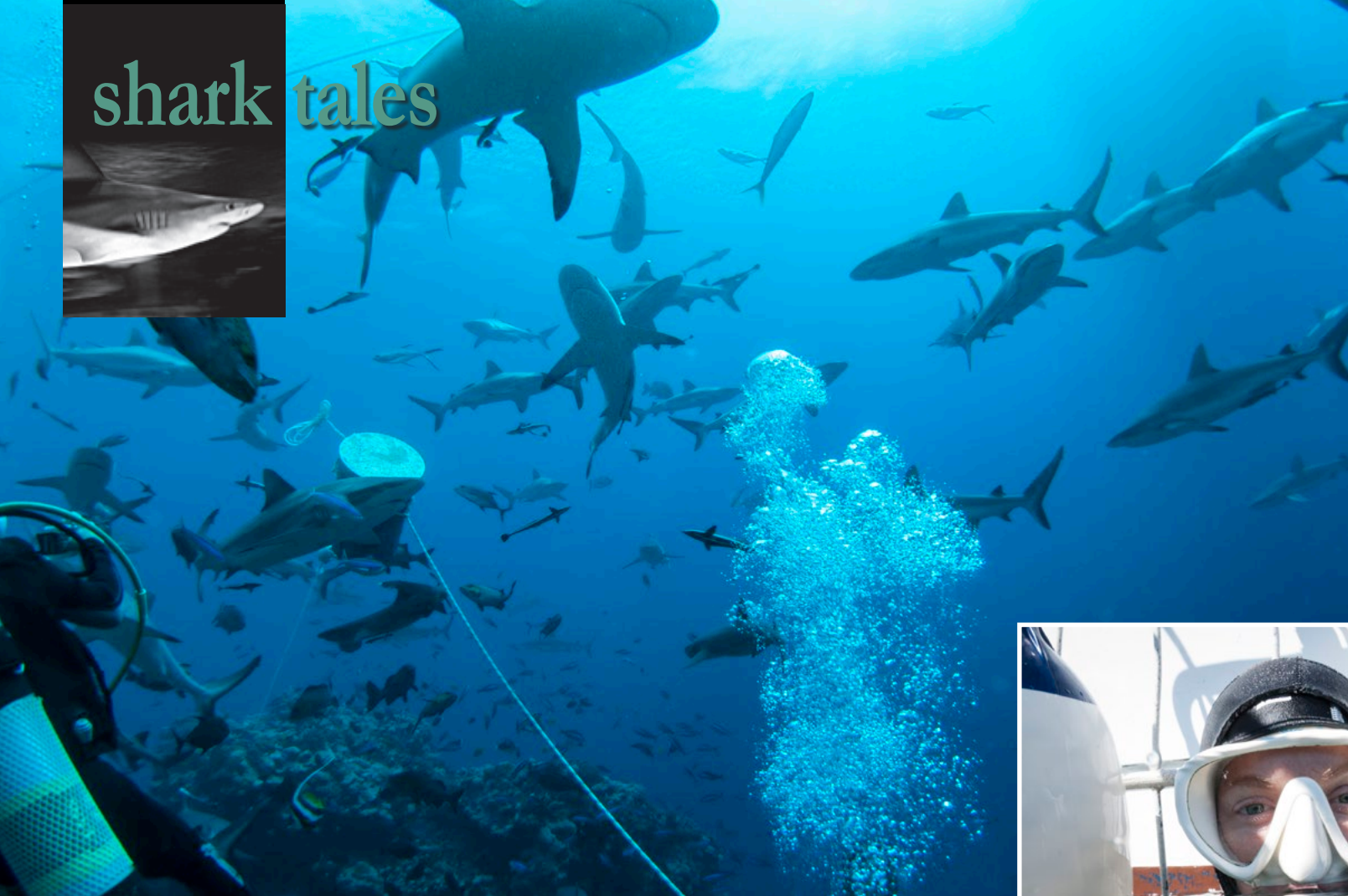
Before the dive

When you take part in a shark dive, chances are you are doing something that has been done many other times by lots of other people. Get as much information as possible about the dive before you go. What depth is the dive at? How long is the dive? How are divers

Shark Diving

— *Tips on Photographing Sharks*





Sometimes we are so focused on the action in front of us that we don't realize we are also capturing distractions, such as the bubbles of a diver in front of you (left); Putting water in front of the sharks can give the viewer a sense of a shark in moving forward (below); Brandi Mueller in the great white shark cage, South Africa (center inset)

Shark Dives

the show. There may be a coral or rock amphitheater at your back, and divers line up so no one is in front of each other. Not swimming around the feeding area (unless permitted) keeps both the sharks from being scared away and other divers from getting in the way.

Chum. Do not touch the chum. Your dive guide might be hand-feeding the sharks, and yes, they are probably getting closer to the sharks than you. But they have been trained to do this and have years and hundreds of dives practicing this. Most dive guides for shark dives know individual sharks based on their looks and behaviors—they know



arranged (is there a better spot for taking photos?) Consult with the dive operator, tell them what you hope to capture on the dive (sometimes they will place you in the best spot for photos just by letting them know that's your interest.)

Usually, you will want to use the widest angle lens you have, as the action usually takes place over a large area. A quick Google search will usually bring up hundreds of images from popular shark dives, if you want to see other photographers' images. Powerful strobes are recommended—but be ready to turn them off if there is a lot of backscatter or the sharks are too far away for them to be useful. Coming to the dive prepared is the first step.

Once at the dive shop or dive site, listen to your dive guide (they have done this before). Be sure to pay attention to the rules and follow them, as they are meant to keep you safe, and more importantly, keep the

sharks safe.

The rules include where "divers should position themselves", which hopefully will keep other divers from being directly in front of you so you do not end up with mostly shots of other divers. Following the guidelines for that particular dive also leads to the sharks coming as close as possible without being scared away. Sometimes all it takes is one diver who swims out into the middle of a shark feed and all the sharks disappear. Don't be that guy, or let your buddy be that guy. Finally, do not be afraid to ask questions. The dive guides want to help you have the best shark dive they can give you so you can get the photographs you hope for.

Following the rules is also important for your own safety. Certain types of sharks exhibit different reactions to divers. When I participated in diving with tiger sharks (without a cage) in South Africa, an extensive pre-dive

briefing was given that directed divers not to wear anything colorful or shiny (no jewelry), "to wear black gloves," not to flail around and to have good buoyancy control.

Sharks are curious and colors, shiny objects, and looking like an injured seal make them want to check you out. Ungloved hands that are flapping around can also appear like little fish in distress, which are a favorite shark snack.

During the dive

Follow the above rules. (Trust me, the dive guide wants you and everyone else on the dive to get amazing photos and have a great dive.) Often shark feeds are set up so that all divers will have a good view of

Showing the shark and the bait can help a viewer understand what was happening during this experience.



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Shark feed, Roatan, Honduras (left); Cropping too tight on a shark at center of photo is not very interesting (above)



Shark Dives

Cropping the same photo with more negative space in front of the shark implies motion

which sharks they can get close to and which ones not to. They also know behaviors to watch for (you don't have that experience).

Scouting the scene. After the initial rush of, "Oh my goodness, there are sharks everywhere!" —try to take in the whole scene. Where are the other divers? Where are their bubbles? Hopefully, not right in front of you, getting in your photos. In which areas are the sharks most concentrated? Think about which of these things you want to portray in your photos. Most of the time, the shark action lasts the entire dive, so you have the time to plan and execute the shots you desire.

Distractions. Be on the lookout for distractions. There is nothing worse than only seeing what you want to see on a dive, such as the sharks right in front of your lens, but then after the dive, noticing that there was a diver slightly lower and on your right and their head and bubbles are in every shot.

Test shots. Snap a few test shots and look at your camera screen to make sure you like what you are getting (I know, it's hard to take your eyes off the action in front of you, but do try to check the screen during the dive). Also be aware that small bubbles on the lens of your camera need to be gently brushed away or they will appear as dots (similar to backscatter) in your photos.

Angles. Try different angles—which sometimes can be hard because usually you are directed to stay in the same place, but you can move your camera to shoot from different angles. In some shots, you will want divers with the sharks, in order to show perspective, such as how close the sharks get to the divers. This can help your viewers to get a feel for the whole set-up of the dive (lots of sharks, lots of divers).

Bait bucket. Get some shots of the

bait bucket, or of the dive guide controlling the bait and the opening of the bucket. Usually, you can also get some shots of individual sharks. Look up and see if any

are going overhead, which can lead to dark shark shadows in sunbursts if it is a sunny day. If you are sitting at the edge of the group, you might be able to get some single sharks to your side as well or sharks that pass directly in front of you.

Backscatter. Backscatter can be a

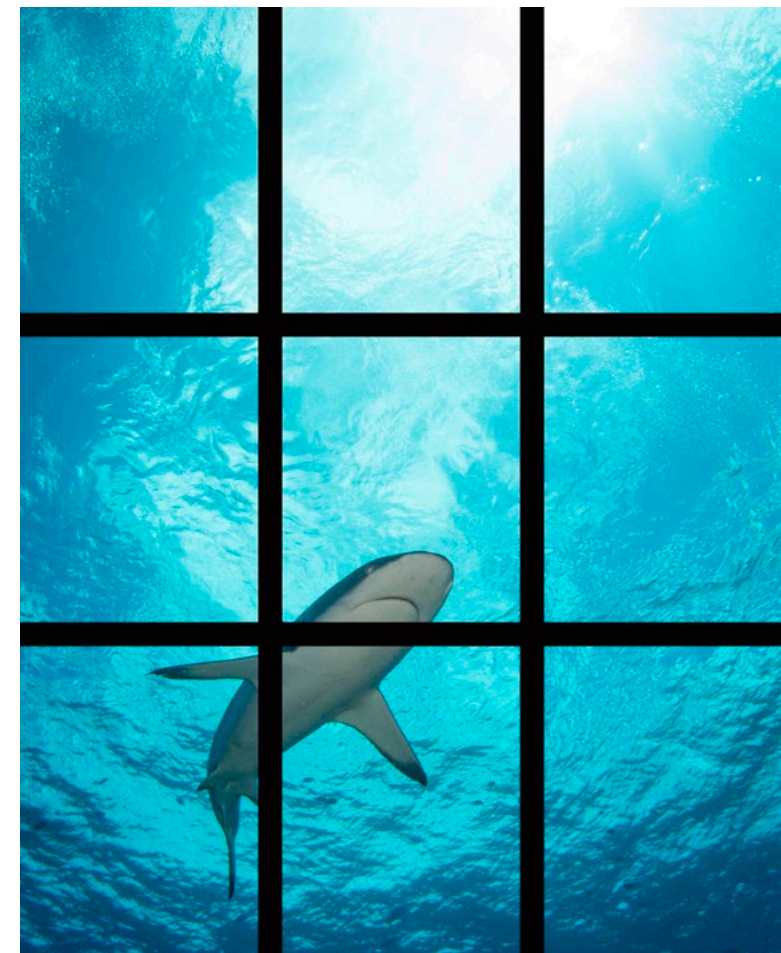
problem on any dive, and strobe positions can be a key factor. Make sure the strobes are as far away from the camera port as possible and angled to help reduce backscatter. If the shark action is taking place further than your strobe

light will reach, the strobes are not adding any benefit other than creating backscatter. In this case, you may want to turn them off and take some natural light shots. Try some shots with them on and some with them off.

Negative space. Don't forget about negative space. Negative space can help balance a photo, especially in the chaotic mess of sharks, divers and fish that occur during shark dives. If you can get the surface in a shot, it can help viewers to feel as if they are underwater with you on the



If sharks are swimming overhead, you may be able to single out a shark and get photos with less chaos and at a different angle.



Using the Rule of Thirds by positioning a shark at the intersection of lines in a cropped image can create a more interesting composition.



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Feeding at the end of a shark dive—the opening of a bait bucket is when action happens quickly (left); Shark feed at Osprey Reef, Great Barrier Reef, Australia (below)

days that don't do even a little touch-up. Shooting underwater can be hard, especially in the chaos of a shark dive where there are sharks everywhere, people and bubbles everywhere, backscatter, lighting issues, etc. A little editing can help you achieve the same ideas already discussed that weren't exactly executed.

Backscatter. An obvious edit is removing backscatter, as even when shooting without strobes, you are likely to have some spots from sun-lit particles, bubbles on your lens or dust on your sensor. Sometimes, the clone tool may be used to remove a distracting remora, divers' bubbles, or a part of

a shark that did not make it entirely into the frame.

Cropping. Cropping is also a great tool that can be used to create different effects. The Rule of Thirds suggests that images are more aesthetically pleasing when the subject is not in the center of the photo. This is achieved by drawing three imaginary lines top and bottom, dividing the image into thirds vertically and horizontally, and placing the subject at the intersection of those lines. Usually, it is easier for us to focus and take a shot when the shark is directly in the center of the viewfinder, but that does not always make for very interesting images.

dive. Having water in front of a shark can imply motion or show that the shark is moving somewhere in an image.

If a bait bucket is opened at the end of a dive, there is usually quite a rush of activity that happens very quickly. Usually, the dive guide gives some sort of signal that this is about to happen, so you can have your camera ready.

Shallow dives. You do not always have a choice, but shark dives that take place in shallower waters are better in terms of lighting and color. You can also stay longer on shallow dives, as you go through air more slowly and have more no-decompression time.

Repeat dives. Another way to get great photos is to do the dive twice, if you have the opportunity. There's noth-

ing like having done a dive to really understanding it. And nothing beats having seen photos you took on one dive, noting what you liked and what you did not like, and then being able to do it again, to improve your shots.

After the dive —Post processing

Now you are home, the post-shark dive adrenaline is still rushing, and you can't wait to look at your photos. You download, and wow, you took 1,200 photos...in one dive. Well done! Going through them takes longer than the dive itself did, but after initially deleting the obviously bad shots, you still have plenty to choose from.

Ideally, we always want to shoot a perfect image in camera, but you will be hard-pressed to find many underwater photographers these



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Converting a photo to black and white (right) can add contrast, texture and drama, saving a photo that is very blue (below)



Cropping and moving the photo to follow the rule of thirds is an easy way to add balance and interest to a photo.

Negative space can also be adjusted through cropping to help add balance. By putting negative space in front of a shark or other large or fast moving subject can imply motion or show that the shark is going somewhere, and this can easily be done by moving the shark to one side of the photo so that blue water in front of it.

White balance. Post-production white balancing can be a savior in bringing some color back into those photos where everything looks blue. Even with strobes, sometimes the sharks are further away than strobe light will reach. Manually white balancing underwater can help, but can be time consuming, so if you didn't get around to doing it on the dive, you may be surprised how much color contrast you can get back by using the white bal-

ance function in an editing program after the dive.

Black and white. Sharks and shark dives are great for converting to black and white. People are drawn to monotone images for many reasons, including how it makes images look like they have more contrast and texture, and possibly more implied drama in an image. Going black and white can also be a great way to save a photo that appears extensively blue and post-processing white balancing doesn't help. Converting to black and white and increasing contrast, darks and lights can add much needed contrast to an otherwise blue-on-blue photo.

Sometimes, we find that the 1,200 photos we took on a shark dive all appear very similar and a little bit of editing can create different effects and add variety to your photos. What you edit and how much you edit is at your discretion, as the artist behind the image. Extensive editing—especially the removal or addition of people, animals, and large objects—is some-



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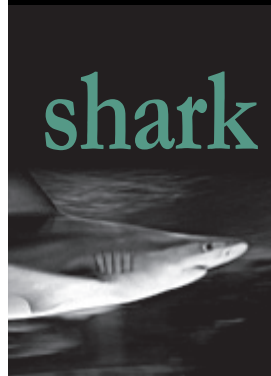
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Shark feeds at Roatan, Honduras (right), in Turks and Caicos Islands (far right) and in South Africa (lower right)



Shark Dives



times frowned upon, as it changes the truthfulness of an image.

But it all comes down to what you are trying to portray to your viewers. If you want to document a shark or a dive, then extensive editing may show what wasn't actually there. But if the object

of a photo is for artistic purposes only, then edit away. Be prepared describe your edits, especially when entering photos in contests, as many have very specific rules on what can and cannot be done, post-production.

Ragged tooth sharks: South Africa; and North Carolina, USA

Blacktip reef sharks: Yap and French Polynesia

Oceanic whitetip sharks: Bahamas

Tiger sharks: South Africa and Bahamas

Blue and mako sharks: South Africa; US Atlantic Coast; and California, USA

Grey reef sharks: Turks and Caicos Islands; Roatan, Honduras; and the Great Barrier Reef, Australia

As a final tip, I want to stress that while you are photographing shark dives, remember to try different things on your dive. These dives are one of the rare occasions where you are likely to have lots of time to photograph the same subject. It is easy to get over-excited and just snap, snap, snap the same shot over and over. I like to take the first 15 minutes of the dive to "snap, snap, snap" and be awed at the amazing experience. After that, I stop for a second and think about what I could do differently.

Where to go

There are many popular places to shark dive and many difference species of sharks that are possible to see. Some are seasonal, so it is always good to check when the best time and place is to see a certain shark, so you don't get skunked. Below are a few examples.

Great white sharks: South Africa; Baja, Mexico; and Australia

Bull sharks: Bahamas, Mexico and South Africa

Change your settings, change your strobe angle (or turn it off for a few shots), try video—whatever, really, just do something else. That way when you get home, your photos won't all be the same. You'll thank me later, I promise. ■

* Disclaimer

You may have noticed in this article that there was no mention of the heated debate over using bait to entice sharks for these types of dives. It was hard to write about photographing shark dives without discussing the controversy involved in altering a natural habitat, and possibly shark behavior, with bait and the presence of many divers. Clearly, there are two sides to this story and, as always, a right way and a wrong way to do things. The best solution I came up with is to separate the topics and discuss the heated debate on shark dives in a separate subsequent article. So, be



sure to check out the next issue to read: "To Shark Dive or Not to Shark Dive."

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in the Marshall Islands. When she's not teaching scuba or driving boats, she's most happy traveling and being underwater with a camera. Visit: **Brandiunderwater.com**.

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NEIL GELINAS/NATIONAL GEOGRAPHIC

A natural rock formation known as "Darwin's Arch" protrudes from the water southeast of Darwin Island. The waters around the small, remote islands of Darwin and Wolf contain the largest biomass of sharks on the planet.

Largest shark biomass found in the Galápagos Islands

Northern Galapagos islands of Darwin and Wolf are home to the largest shark biomass reported to date. Despite the large shark biomass, the abundance of reef fishes in this area has been severely reduced because of excessive fishing.

Overfishing has reduced biomass of most sharks and other large predatory fishes worldwide by over 90 percent, and even remote locations have been severely impacted. However, a few localities worldwide still maintain large abundances of top predatory fishes due to either being remote and unfished, or hav-

ing recovered after full protection from fishing.

Crossroads of currents

The oceanographic setting surrounding Galapagos results in a wide range of marine ecosystems and populations. Galapagos is the only tropical archipelago in the world

at the cross-roads of major current systems that bring both warm and cold waters. From the northeast, the Panama Current brings warm water; from the southeast, the Peru current brings cold water; and from the west, the subsurface equatorial undercurrent (SEC) also brings cold water from the deep.

Large sharks benefit from marine reserves

Expansion of protected areas into US federal waters could safeguard core home range areas used by bull, great hammerhead and tiger sharks.

Current research has shown that waters off Florida and the Bahamas are important pupping and feeding grounds for several sharks, providing them with the critical habitat required for the conservation of these slow-to-mature ocean animals.

Researchers at the University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science studied the core home range of 86 bull, great hammerhead and tiger sharks tagged in waters off south Florida and the northern Bahamas. The aim of the study was to find out

whether these highly mobile shark species would benefit from spatial protection, such as marine protected areas (MPAs).

The team examined shark movements in core habitat use areas, or CHUAs, where the sharks were spending the majority of their time, in relation to zones that prohibited fishing or were these sharks were already fully protected within areas of the United States and Bahamas exclusive economic zones (EEZs).

The results show that none of the tracked bull shark's regional CHUAs were in areas

that are fully protected from fishing; and for the great hammerhead and tiger sharks tracked, only 18 percent and 35 percent, respectively, of their core use areas were currently protected. The study also found that the majority of the CHUAs utilized by all three shark species were within the US EEZ.

The findings suggest the expansion of protected areas into US federal waters would safeguard all of the core home range areas used by these three species of sharks.

■ SOURCE: UNIVERSITY OF MIAMI

Shark hotspot

Within the 138,000 sq km Galapagos Marine Reserve (GMR), the far northern islands of Darwin and Wolf represent a unique "hotspot" for sharks and other pelagic species. An ecological monitoring program has visited the islands over the past 15 years with a strong sampling focus to survey reef fishes and invertebrate communities. However, no study to date has examined extensively the abundance, size and biomass of sharks and other large predatory fishes around Darwin and Wolf.

Enforcement needed

Given how important the Galapagos are to Ecuador's

tourism industry and to the well-being of these top predators, scientists from the Charles Darwin Research Station (CDRS) and the National Geographic Society urge strong enforcement of the new marine sanctuary in a study they just published in the journal *PeerJ*.

Although Darwin and Wolf are within the GMR, they were not fully protected from fishing until March 2016. Given the ecological value and the economic importance of Darwin and Wolf for the dive tourism industry, the current protection should ensure the long-term conservation of this hotspot of unique global value. ■

SOURCE: NATIONAL GEOGRAPHIC PRISTINE SEAS

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PETER SYMES



Reef sharks prefer small meals

New study shows that most coral reef sharks eat prey that are smaller than a burger, and typically eat small fishes, mollusks and crustaceans.

Researchers from James Cook University's ARC Center of Excellence for Coral Reef Studies examined stomach contents of reef sharks and conducted chemical analyses of shark body tissue to find out what they had been eating.

Somewhat surprisingly after pumping sharks' stomachs to identify the contents of the last meal, the most common thing to find was in fact, nothing.

"These results suggest that reef sharks eat small meals infrequently and opportunistically," Lead author, Dr Ashley Frisch said.

To understand what the sharks were eating over longer periods, the researchers analyzed shark body tissue. They found that the

chemical structure of the sharks' body tissue actually matched closely with that of large reef fishes such as groupers, snappers and emperors.

Not apex predators

In turn, this means that reef sharks do not occupy the apex of coral reef food chains, but instead have functional roles similar to those of other large predatory fishes.

Co-author of the study, Dr Justin Rizzari, said the new research changes how scientists think about food webs on coral reefs and acts as a reminder that large, conspicuous predators are not always at the top of the food chain. "We now know that reef sharks are an important link in the food

chain, but they are not the last link in the food chain. In most cases, the top predators are tiger sharks, hammerhead sharks, or people," Rizzari said.

In the case of reef sharks, the dietary analyses suggest they should be reassigned to an alternative trophic group such as high-level mesopredators. This change will facilitate improved understanding of how reef communities function and how removal of predators (e.g., via fishing) might affect ecosystem properties. ■

SOURCE: CORAL REEFS

Coastal marine parks not enough to protect large sharks

A study tracking the migratory patterns of tiger sharks across the Southwest Pacific reveals that coastal marine parks provide only brief protection for these important marine predators, while oceanic reefs, vital to their ecology, are overlooked.

Knowledge of the habitat use and migration patterns of large sharks is important for assessing the effectiveness of large predator Marine Protected Areas (MPAs), vulnerability to fisheries and environmental influences, and management of shark-human interactions.

A four-year study by shark research scientist, Dr Jonathan Werry, in collaboration with the French government, followed the movement of tiger sharks across the Coral

Understanding the habitat-use and migration patterns of large sharks is extremely important for assessing the effectiveness of Marine Protected Areas.

Seaf. The study looked at migratory movements and fidelity to specific reefs for tiger sharks tagged in New Caledonia, the east coast of Australia (the Great Barrier Reef) and oceanic reefs in the centre of the Coral Sea. Thirty-three tiger sharks (1.54 to 3.9m in total length) were tagged with

passive acoustic transmitters and their localized movements monitored on receiver arrays.

From 2009 to 2013, 14

sharks with satellite and acoustic tags undertook wide-ranging movements up to 1,114km across the Coral Sea. One 3.7m female tiger shark was recorded to a previously unknown depth of 1,136m. The Chesterfield Islands appear to be important habitat for sub-adults and adult male tiger sharks.

Tiger sharks are often considered to be a reef-associated "coastal" species that exhibits seasonal and diel visits to coral reef lagoons when traversing between coral shoals and atolls. On coastal reefs, however, all of the monitored tiger sharks were found to be transient. ■

SOURCE: PLOS ONE