

THE SAND TIGER SHARKS OF NORTH CAROLINA

PEACEFUL OGRES
OF THE DEEP



Underwater photographer and conservationist Tanya Houppermans reveals the spectacular beauty and tragic plight of the misunderstood *Carcharias taurus*

TEXT AND PHOTOS
BY TANYA HOUPPERMANS
www.BlueElementsImaging.com

■ A Sand tiger shark
Carcharias taurus is
surrounded by spade fish
and small bait fish in the
waters off of North Carolina.



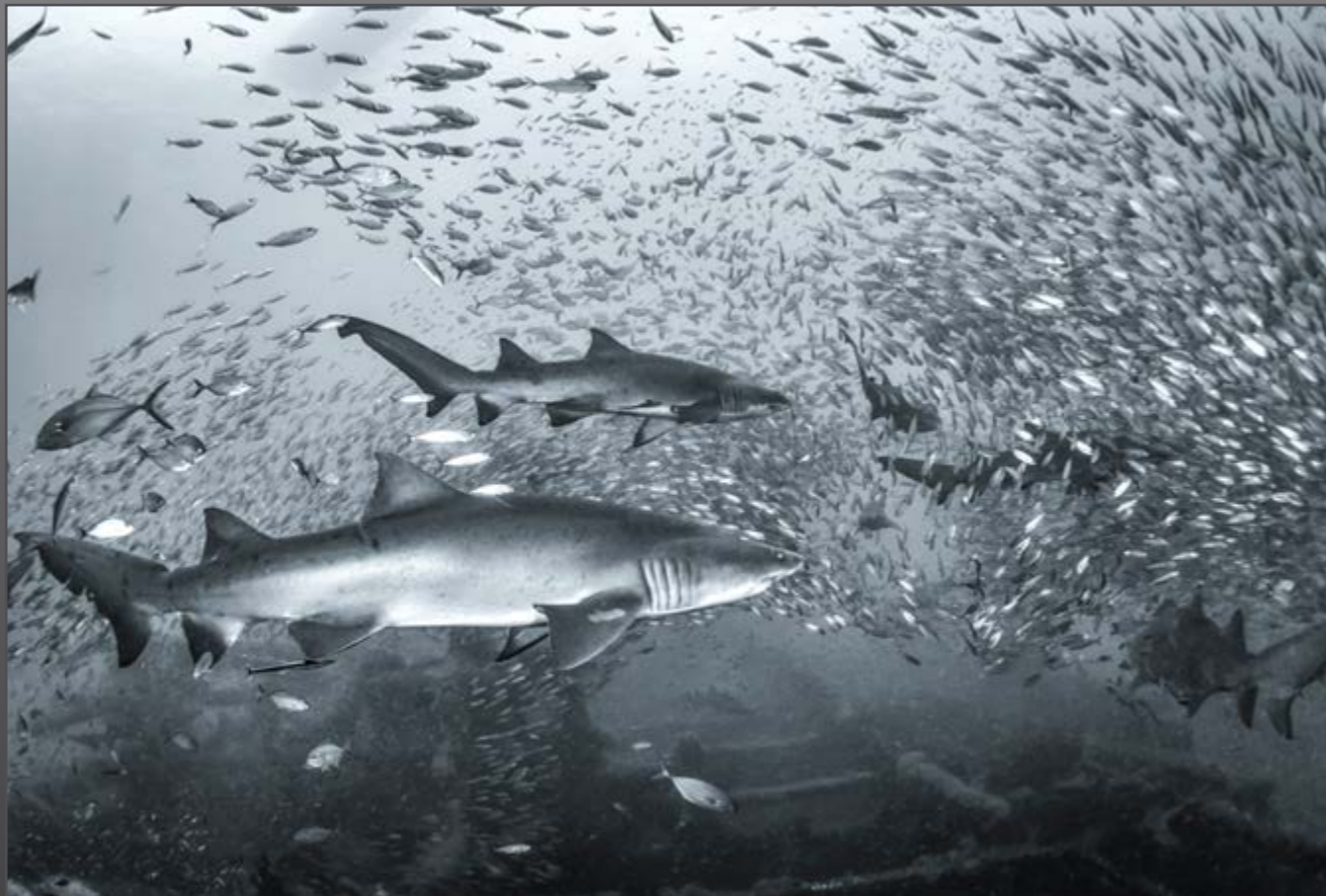
*I*n the summer of 2009, I saw my first Sand tiger shark. I was a new diver, only having been certified six months prior, and I was off the coast of Morehead City, North Carolina to earn my Wreck Diver certification. As my instructor and I inched forward into the wreck of the tanker *Aeolus*, we reached an open area. There in front of us were six Sand tiger sharks, lazily circling inside the wreck, seemingly unfazed by the appearance of the two strangers in their midst.

I was immediately struck by the dichotomy between the sharks' appearance and their behavior. Here were these ferocious-looking animals with rows upon rows of jagged teeth jutting from their jaws, yet there was nothing even remotely aggressive about them. Their demeanor was calm, almost lethargic. Although it was clear that they were watching us, they did not act nervous or skittish. As my instructor and I slowly made our way through the wreck, one of the Sand tigers gently brushed up against my arm. I felt no fear, just complete and utter awe. And I quickly realized that these were not the vicious monsters so often portrayed by the media. I was fascinated, and I decided in that instant that I wanted to come back and spend more time with them. These encounters with Sand tiger sharks led to my picking up a camera for the first time in hopes of changing the public's negative perceptions about sharks

continued on page 93 >



Sand tigers come together in large groups off the coast of North Carolina during their annual migration along the east coast of the U.S.



through my images. Eventually I left my corporate job to become a full-time underwater photographer and shark conservationist, all from being inspired by those first dives with the Sand tiger sharks of North Carolina.

The Sand tiger shark *Carcharias taurus*, also known as Grey nurse or Ragged-tooth shark, is a migratory shark living in warm coastal areas worldwide, with the exception of the eastern Pacific. They prefer shallower waters ranging in depths from 5-620ft (1.5-189m) where they feed on small bony fish, crustaceans, squid, and stingrays. Adult Sand tigers grow to 6.5-10.5ft (2-3.2m) and weigh 200-350lbs (91-159kg). Juvenile Sand tigers are sometimes preyed upon by larger shark species, while adult Sand tigers have no

predators except, of course, humans. Sand tigers are unique among all shark species in that they control their buoyancy by swimming to the surface to gulp air into their stomachs. The air acts like an internal balloon, allowing them to hover motionless in the water column where they can seize prey as it swims by. Sand tiger sharks are able to remain motionless and still breathe by using their cheek muscles to pump water over their gills, known as buccal pumping. They are able to switch back-and-forth at will between buccal pumping and ram ventilation, which is where they swim forward to push water over their gills. A female Sand tiger shark will carry about one hundred eggs inside her body until they hatch, then give birth to live young. But before the live birth occurs, the ultimate "survival of the fittest" takes place. As the

continued on page 95 >



Far left: the wreck of the tanker Atlas is a favorite hangout for Sand tiger sharks. Right, thousands of small bait fish surround a Sand tiger as it swims past the conning tower of the German submarine U-352.



■ A lone Sand tiger glides over the sea floor next to the wreck of the German submarine U-352, which lies in 120ft of water 30 miles off the coast of North Carolina.

Right, an underwater photographer takes a moment to admire a Sand tiger shark as it passes overhead. Far right, Sand tigers do not have to continually swim to breathe. Even when resting on the sea floor, they can still breathe by using their cheek muscles to pump water over their gills.



eggs start to hatch, the developing Sand tiger embryos will eat the unhatched eggs, and then actually start to devour each other! While it is not unheard of for other species to eat unhatched eggs in utero, the Sand tiger shark is the only member of the entire animal kingdom known to carry live embryos that will consume their siblings before birth. By the end of the nine to twelve month gestational period, only two pups are left, the rest having been eaten. Sand tigers only give birth every two to three years, making theirs one of the lowest reproductive rates of all the sharks. The mother Sand tiger does not tend to her babies after birth; the young Sand tigers are on their own, already knowing how to catch and eat live prey as they begin their journey to adulthood.

The waters off of North Carolina are known as "The Graveyard of the Atlantic" for the nearly 1,000 shipwrecks that line the coast. These wrecks date back to the 16th century and are the result of the many hazards sailors have encountered in the area including strong currents, shoals, severe storms, and marine warfare from the Civil War through World War II. The shipwrecks create artificial reefs that provide an outstanding environment for life to thrive, including the sand tigers that frequent the wrecks. No one is quite certain why the Sand tigers tend to congregate around the wrecks, although several theories have been put forth including the sharks using wrecks as navigational aids during their coastal migration, or perhaps they enjoy the abundance of food sources in the smaller

continued on page 97 ➤



Sand tiger sharks are a ■ critical part of a healthy ocean ecosystem in the waters off of North Carolina.



fish that also live around the wrecks. North Carolina is one of the few places in the world where scuba divers can enjoy the thrill of sharks and shipwrecks in the same dive. Although Sand tiger sharks are found in the waters of North Carolina year-round, the summer offers the best conditions with warm water (temperatures at depth average 80°F in the summer, or 27°C), and visibility reaching 80-100ft (24-30.5m) or more. The boat rides out to the dive sites can be long, usually one to three hours, but certainly worth it after descending into the warm, clear water to the sight of a shipwreck emerging in the blue. After reaching the wreck, divers usually first notice shadows moving slowly in their field of view. A closer look reveals the Sand tiger sharks, leisurely drifting by, almost sluggish in appearance. Sand tigers

are quite tolerant of divers, allowing them to come into close proximity to get a better look or take a photograph. But approach too quickly or make a sudden movement, and a diver is likely to be startled with a sudden loud *boom* and a compression wave of water from the flick of the Sand tiger's tail as it speeds away.

While the sight of a handful of Sand tigers on a shipwreck would be considered a great day in the water for most any diver, those lucky enough to dive North Carolina in the July/August timeframe are in for the ultimate show. For reasons we don't quite yet understand, Sand tigers by the dozens tend to aggregate around the wreck of the cargo freighter *Caribsea* during mid-summer. Numbering 60-100 or more, the Sand tigers slowly cruise together in mid-



Far left, author Tanya Houppermans in action among a school of Sand tigers (photo by Mike Gerken); left, very few places in the world offer shipwrecks and sharks in the same dive. Here, Sand tiger sharks swim around and inside the wreck of the Spar.



■ The wreck of the U.S. Coast Guard Cutter Spar is a favorite hangout for Sand tigers.

water, around the 45-65ft (14-20m) range. Interestingly, the overwhelming majority of these Sand tigers are female, with many being pregnant. Do the female Sand tigers give birth nearby? Where are the male Sand tigers? We simply don't know, although research is currently underway to try to answer these and many more questions about Sand tiger sharks. In the meantime, summer divers in North Carolina have the honor of witnessing one of the most awe-inspiring sights nature has to offer as Sand tiger sharks surround them as far as the eye can see.

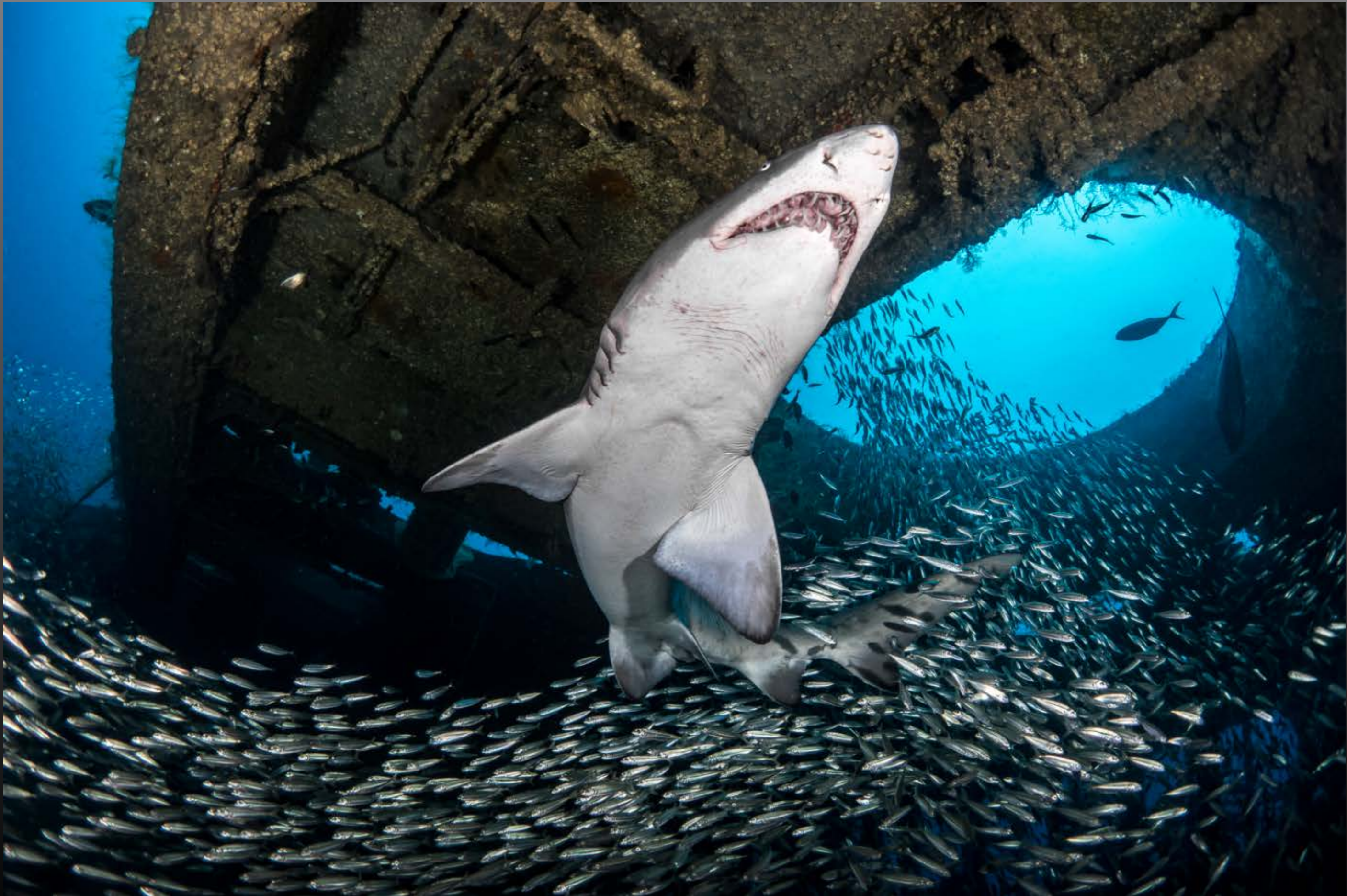
Sand tiger sharks have been protected in U.S. waters since 1997, and all states from Florida to Maine along the east coast of the U.S. have banned the retention or possession of Sand tigers. These sharks were heavily exploited in the 1980s and 90s, when populations fell by 75% due to commercial and recreational overfishing. Their numbers in U.S. waters have improved slightly since gaining protected status, but Sand tigers are still listed as "Vulnerable" on the International Union for the Conservation of Nature Red List of Threatened Species. The odds are stacked against Sand tiger populations recovering more quickly due in large part to the nature of their biology. Sand tigers take several years to reach sexual maturity - six to seven years for males and nine to ten years for females. And since they have a long gestational period of nine to twelve months, only giving birth to two pups at a time, any recovery of Sand tiger populations is going to be a slow process. Even with legal protections in place, Sand tiger sharks still face daily threats from people. In my own experience, I have not been on a single dive with Sand tiger sharks where I have not seen some form of negative impact on them from humans. It is



■ A Sand tiger swims under thousands of small bait fish on the wreck of the Caribsea.



Every year around mid-summer, huge aggregations of Sand tiger sharks can be found near the wreck of the Caribsea.

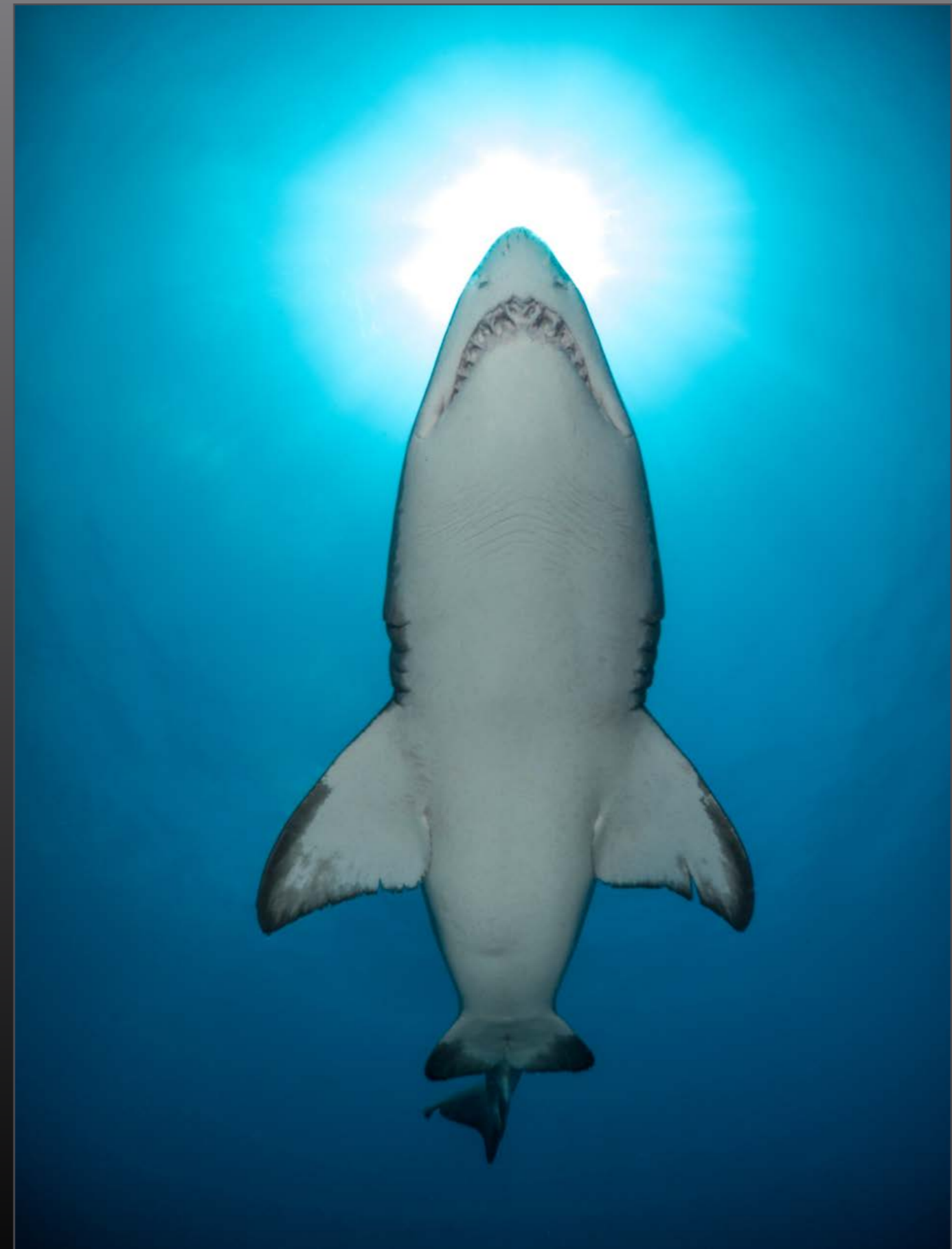


■ A Sand tiger swims through a river of bait fish inside the wreck of the Aeolus. Details of Tanya Houppermans' next dive expedition to shoot Sand tiger sharks can be found at <http://www.blu.eelementsimagi ng.com/NorthCarolina2017>

not at all uncommon to see Sand tigers with hooks imbedded in their jaws, some trailing several feet of fishing line. But this is nothing compared to the two worst cases of harm to Sand tigers that I have personally witnessed. Last year I sighted a female Sand tiger shark with fishing line wrapped around her torso. The fishing line was so tightly embedded that it had cut nearly an inch into her skin. She was a small shark, so it was clear that as she was growing, the fishing line was cutting deeper and deeper into her skin. My dive buddy and I hoped to be able to cut the line away, but she was frightened and quickly swam away. And just a few months ago I witnessed a tragedy that still haunts me. As I swam to the bow of the wreck of the *Caribsea* I saw a Sand tiger lying on the sea floor. It was quickly apparent that something was wrong. She was curled up (most sand tigers will lie flat on the sea floor) and was only ventilating through her left gill. As I slowly approached, she didn't move at all; she just kept staring at me. Then it became obvious what had happened as I noticed a fresh wound on her upper neck region. She had been hooked (the line was still in her mouth), but instead of cutting the line and simply letting her go, whomever hooked her then plunged a sharp object through the back of her head that must have severed part of her spine. She was then thrown back into the sea where she came to rest under the bow of the wreck. She couldn't move and she couldn't eat. There was nothing we could do for her. We know that she lay there for at least two days before she wasn't seen anymore. The loss of a single sand tiger, especially a female of breeding age, is devastating to their populations, and also heartbreaking for those of us who care deeply about these sharks. The good news is that with the implementation of protection measures in the U.S. for Sand tiger sharks, they still have a fighting chance to come back from the brink of extinction. Current research is being conducted

to determine where they mate and give birth, what their migratory patterns are, and the extent to which their populations are rebounding. This information will then be used to influence laws and regulations pertaining to recreational and commercial fishing off the east coast of the U.S., hopefully leading to more protection not just for the sharks, but also for the areas they frequent. In addition, Sand tiger sharks are helped through the efforts of numerous shark conservation organizations both locally and globally that educate the public about the importance of not just Sand tigers, but of all sharks in maintaining healthy ocean ecosystems. In North Carolina several local dive operators and aquariums conduct frequent community outreach and educational programs to involve the public in protecting the marine life in the waters off the coast. When people become informed about the Sand tiger sharks living offshore, they usually stop fearing them, and start wanting to protect them instead.

I am still just as fascinated by Sand tiger sharks as I was when I made that first dive with them seven years ago. Every time I descend into the waters of North Carolina, I look forward to seeing them again, just like visiting old friends. I feel very fortunate to be able to share their lives through my images. Sometimes those images show the good, such as a female Sand tiger carrying pups, or dozens of Sand tigers swimming together in harmony. And sometimes the images show the bad, as in the cruelty that humans have inflicted upon them. But together they all tell the story of a beautiful but misunderstood animal that deserves our respect and protection as a vital part of the marine ecosystem. And even though I've traveled the world photographing numerous shark species, I keep coming back to North Carolina to the Sand tiger sharks that first captivated me as a new diver.



■ An impressive backlit portrait of an adult Sand tiger shark *Carcharias taurus* as it swims under the sun through the clear blue Atlantic waters.



■ A Sand tiger is surrounded by a school of bait fish as it swims over the wreck of the tanker Papoose.

Another ■ stunning image of the Sand tiger shark schools which congregate every year - around mid-summer - near the wreck of the Caribsea.

