

Unravelling the mysteries around the White Shark

Five days tracking in the name of science

By Mario Lebrato

They appear as renowned TV stars in the documentaries, being the most feared creatures in the oceans for the beach lovers since Spielberg labelled them as “man-eaters”. However, few human beings have been close to them, and even less has had the possibility to touch them. Myself, an aspirant scientist studying “Marine Biology and Oceanography” in the National Oceanography Centre (University of Southampton) came across the possibility to encounter face to face, one of the most enigmatic, misunderstood and feared predators on Earth in the waters of South Africa. This opportunity could not be qualified as a diving adventure or a photographic trip, but as a research experience for a student like me, taking advantage of the possibility of performing my still immature photographic skills during the scarce free time during the research project.

Popular destinations during the last years for the ecotourism industry to the encounter of the White Shark (*Carcharodon carcharias*), the waters around South Africa deserve, indeed, the reputation they have achieved. Populations of this apex predator reach presumably their highest and wealthiest numbers in the world around Dyer Island, Geyser Rock, and the “Ring of Death” in False Bay. Scientific studies based on Photo Identification of the dorsal fin, which acts as a fingerprint, reveal a stable population of roughly 1000 recognizable Great Whites around Dyer Island (Scholl, 2002).

This figure entails a degree of error because, for instance, some individuals could not have been recognized as “new” ones during the field monitoring studies. Yet, for the avid diver as well as for the enthusiastic photographer looking for a lifetime experience, this is the right place to go. I would even challenge the “hesitant” public by saying that chances of watching a White Shark in its realm from the cage, from the boat, breaching, or just passing and keeping an eye on you are the highest on Earth, always with benign weather conditions and during the right season. My own experience demonstrates this efficiency with more than 20 encounter days in a single month, with journeys of more than 15 sharks having visited our research vessel. The potential for the tourism industry is astonishing, but I would like to remind to anyone interested that the pick season is during the cold months (June, July, August and September), when the majority of the Great Whites swim, encircling the islands, in search of the seals that populate these oceanic rocky outcrops.

Seal Island in False Bay is a renowned spot for witnessing natural predation events on Cape Fur Seals (*Arctocephalus pusillus pusillus*). The best





*(Left) Gt white swim past
(Above) Accoustic tag being attached
(Right) Accoustic tag ready to attach
(Below) A wounded Cape Fur Seal*



hours tend to be during the early morning (05.30 until 9.00 GMT) and the late afternoon (18.00 until 21.30 GMT), when the dim light natural condition enables White Sharks to take advantage of their upper dark body and ambush the seals from below. Dyer Island and its adjacent rocky counterpart (Geyser Rock), also shelter a large population, being a traditional diving destination. Trips used to depart from Gansbaai, but since a ramp was constructed in Kleinbaai, the White Shark adventure starts from here, where a good number of operators will take tourists to their encounter. A less known destination is Mosselbaai (the scenario of our research); located further north of Dyer Island. This spot bears a small Seal Island, which acts as a magnetic bar for the White Shark. Despite the remarkable number of sharks present, its remote situation has slowed down the “ecotourism frenzy” and only one

operator works in the waters surrounding the island. Curiously, the seal colony is very close to a popular tourism beach, where incidents with Great Whites are very uncommon, depicting the true nature of this predator, which avoids human encounters and concentrates on energetic preys such as seals and blubber from whale carcasses.

In order to unravel the private and mysterious life of the White Shark, remote sensing equipment provides a powerful and reliable tool to study its movements and activities at a local scale. Acoustic telemetry is a scientific method, part of the remote sensing, that allows the tracking of animals, following their movements in a minute-by-minute time scale. At any one moment, the position of the animal in spatial terms can be acquired to analyze its behavioural ecology. The study, coordinated and developed by the PhD candidate Ryan Johnson,





Shark alley and Cape Fur seals at Geyser Rock

and locate its geo-position). Following the “bip-bip” sounds emitted by the tag through the headphones, we were able to track this specimen for 103 hours non-stop, which constituted a new world record in the continuous tracking of a shark (the previous was 96 hours by Dr. Gruber from Florida University). The track consisted mainly on following the animal and each 10 minutes annotate the geo-position in order to be able to describe the spatial utilization of its habitat.

Mysterious and enigmatic as the White Shark reveals itself, some of the results obtained were striking at the beginning, but started to make sense after sensible consideration.

The daily routine of our individual consisted on staying from around 9 o'clock in the morning until 7 o'clock in the evening near the same place, close to the mouth of a river along a sandy beach. During this period, the animal did not cover much distance range (roughly less than 2-3 km in such an amount of time every day), but remained close to the “surf” part of the beach. In this zone, the waves broke continuously, creating more oxygenated waters;



Sniffing out the bait at Dyer Island

the shark could take advantage of these conditions by swimming more slowly and thus, spending less energy while performing the “ever swim” condition of the majority of the elasmobranchs.

This apparently metabolic benefit of swimming slower in more oxygenated waters could be explained by the fact that hunting a prey in this environment is not an easy task, and White Sharks may space their meals by several days. As if the animal had an internal clock, at around 7 o'clock in the evening and 6 o'clock in the morning (at night was the same story as during the light hours), almost every day the shark departed from its light/dark periods location to the surroundings of its hunting grounds: the Seal Island.

They may be following light cues and then are able to adapt their internal rhythms exactly to our man-made clocks, coinciding with the hours when dim conditions are present, having more chances of getting a meal. Upon arrival to her destination, she started patrolling near the high-risk zone in order to intercept Cape Fur Seals, either departing or coming back to the island. Apparently, the shark



Breaching just in front of the cage

varied its strategy depending on the Moon phase, taking advantage of brighter conditions when full Moon, as opposed to a different strategy in darker situations. This, however, only represents a field appreciation, difficult to test scientifically due to other confounding variables and unknown factors.

One successful breach was witnessed on a Cape Fur Seal. The predation took place at 19:21 GMT, when completely dark conditions were almost present, and then a picture was impossible to take. The seals used all kind of techniques and tricks to avoid becoming the next meal of one of the White Sharks patrolling the island. As shown in one of the pictures, many seals presented healed wounds from past encounters with sharks, mainly inexperienced individuals in the trial and error learning phase. Some fresh injuries also indicate recent hunting attempts where the seal successfully escaped. This fearsome predator has refined its strategy during



Hydrophone machinery to detect the tag

thousands of years of evolution to hunt the seals successfully. At the same time, its prey has also adapted to the situation and only after experience and learning, can Great Whites catch the speedy Cape Fur Seals in the waters of South Africa.

The photographic equipment used during the research study consisted on a NIKON D70 with two camera bodies: a polarized 28-80 mm and a polarized 70-300 mm zoom. I felt quite happy with both; in the relatively close shots, I could get extraordinary pictures. I used polarized zooms because during the majority of the field days, sun conditions were continuous. Operating with a special camera device, I could avoid the shiny and reflectance bits that some shots disclosed. With the second zoom (70-300 mm), I was able to get distant views, which I mainly used in trying to capture the numerous whales at that time of the year. However, whales with calves remained extremely distant and I was not able to get any good image of such a nice pair. I should also have carried a bigger zoom to catch in images the breaching events of Humpback whales (*Megaptera novaeangliae*) in the distance, very poorly performed with my equipment and

probably my inexperience.

Other equipment used was a Konica Minolta DiMAGE Xg, which I remember using in a couple of “wet situations” attached as a critter cam to a pole, in order to get close views and sex recognition by absence or presence of claspers (reproductive organs). For the wounded seal pictures, I borrow a friend’s camera (Panasonic DMC-FZ20). For the next research I am trying to get a housing for the NIKON D70 because the quality of pictures underwater will be increased in case of cage diving or snorkelling.

A note on photographic tips when diving in South Africa is the fact that the normal season to travel is during the cold months and accordingly, the water is freezing and murky. Specially when diving near a seal colony and surroundings, the waters can some times have 1-metre visibility or even less. Amazing pictures are normally taken in other classical destinations with clear waters; South Africa is a typical example of excellent surface pictures, but the majority of the time, discouraging underwater footage. Transparent waters are common during the summer period, when less sharks are present and chances of a shot are intrinsically reduced. Yet, I remember having 3 or 4 days of excellent visibility while being there during the winter, so I guess it is a matter of chance that your White Shark adventure day coincides with positive sea conditions.

As a last note, the operators that organise tourism adventures to the encounter of Great Whites vary in prices and quality, but people have almost the same chances of seeing the animals with any of them. What is true is that one of the boats where I worked for a time before the acoustic tracking, took special care of the animals more specifically

than the others (Barracuda from Shark Diving Unlimited) trying to avoid perturbations, such as flash use or making them jumping excessively after the baited rope end. The boat is also comfortable, big and the service is excellent; they provide transportation from Cape Town, meal, diving gear, as well as accommodation for a reasonable price. I recommend them most strongly to anyone interested in a trip to Dyer Island.

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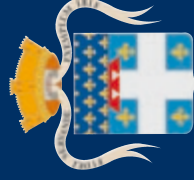
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