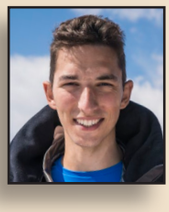
Studying Great Hammerheads in a Single Breath of Air



Lukas Müller is an experienced freediver and photographer, and is currently finishing his master's degree in Marine Resources Management at Wageningen University. Twenty years after his first shark encounter, he hopes to contribute to the protection of sharks by studying their movement ecology and translating his findings into engaging media. His work with great hammerhead sharks is in collaboration with The Watermen Project and Bimini Biological Field Station.

The dorsal fin slices through the water like the blade of a sword. I can feel her power as she passes by me. The blue eyes at the end of her hammer-shaped head are staring at me with confident curiosity. With ease, she circles around me, just close enough for her to see, hear, smell, and feel what I am. This great hammerhead shark is none other than Nemesis, 3.5 meters long and one of the most magnificent creatures I have ever seen underwater. She is named after the Greek goddess who dealt out retribution to those who succumb to arrogance.

The 12-foot female great hammerhead shark named "Nemesis," wearing an X-Tag next to the dorsal fin. Photo © William Winram

Four months earlier, I am sitting at my desk, glaring at the bright screen of my computer. The dozens of tables that I am reading through are squintingly small and full of technical specifications. I am tasked with finding the right pop-up satellite tag for my upcoming field work in The Bahamas. As a master's student in Marine Resources Management, animal telemetry is not a core focus of my studies. It seems like every new piece of information about satellite tags raises even more questions: What tag size? What battery life? What sampling rate? What deployment period? What anchor method? What deployment method? Eventually, I was introduced to Microwave Telemetry, and shortly thereafter these questions seemed rather straightforward. The goal of my master's project is to investigate the habitat use of highly mobile great hammerheads in South Bimini, The Bahamas.

Photo © Lukas Müller

Dr. Tristan Guttridge and William Winram preparing the non-invasive freedive tagging equipment.

This charismatic shark species is classified as endangered by the IUCN. It's an extremely agile predator capable of incredible burst speed swimming. Recently, it has been discovered that these sharks can migrate long distances of over 1500 km. Due to their naturally low abundance and elusive nature, we know very little about the movement ecology of great hammerhead sharks. In addition to their expertise in satellite telemetry, Lucy Howey and Lance Jordan of MTI have invaluable experience in the field and have previously worked on great hammerhead studies. They understand the challenges this specific species poses in not only placing the tags successfully, but ensuring that they stay on and transmit the data reliably. Thus, I could not have asked for a better partnership for this project!

With half a dozen X-Tags and confidence in my equipment, I am departing the plane at South Bimini, together with William Winram, founder of The Watermen Project which funds and supports the project. We are greeted by Dr. Tristan Guttridge, lab director and chief scientist of the renowned Bimini Sharklab. After a short evening briefing and some final transmission tests on the tags, the field work finally begins the next morning. As we leave the protected mangrove-filled inlet on the back of the renowned field station, the air smells like pure excitement. For me, this is the second time working in Bimini, so while the setting feels familiar, freediving with great hammerhead sharks always wakes up every cell in one's body.

Suit? Check. Mask, fins, snorkel? Check. Tagging gun? Check. X-Tag ready to go? Check. As we enter the water, we are immediately surrounded by two dozen nurse sharks trying to suck pieces of dead fish out of the baitbox.

During these two particular weeks, our approach is to use freediving and a tagging gun to place the X-Tags on free-swimming great hammerheads. As sharks are wild animals roaming the sea, it's their decision to show up or not show up. However, the stunningly clear waters and sandy bottoms of Bimini's waters are welcoming us for warm-up dives, and make time fly by fast.

Shortly before I take my last breath for another freedive I have a weird inkling that something big is about to approach us. As I descend to the bottom, I can see a few rays quickly rushing towards the protection of a metal structure close to us. This is a clear sign of a large shark arriving at the scene. Kneeling on the sandy bottom, a giant shadow appears in the distant blue. The massive hammerhead is swimming straight towards me. Fittingly, Nemesis humbles every one of us as she explores the dive site. The contrast between her dark coloration and the white sands below her leaves us mesmerized and fully grounded in the moment. After capturing photo identification, William descends from the surface. With the tagging gun extending from his arm, he is trying to anticipate Nemesis' next move. That's when she boldly turns, in an effort to figure out what the object is that is swimming towards her. That provides an excellent opportunity. The gun triggers. The shaft flies through the water. Seconds later, Nemesis is swimming away with an X-Tag perfectly placed in the thick muscle tissue below the dorsal fin.

In the following days, we went on to place 5 more satellite tags. Luckily for us, Nemesis blessed us with her presence for many hours. Together with satellite tags placed by the Bimini Sharklab in previous years, we will hopefully enhance our understanding of great hammerheads, in particular their habitat use. Our goal is that sharks like Nemesis will roam the waters of The Bahamas and the USA and humble many more future generations.

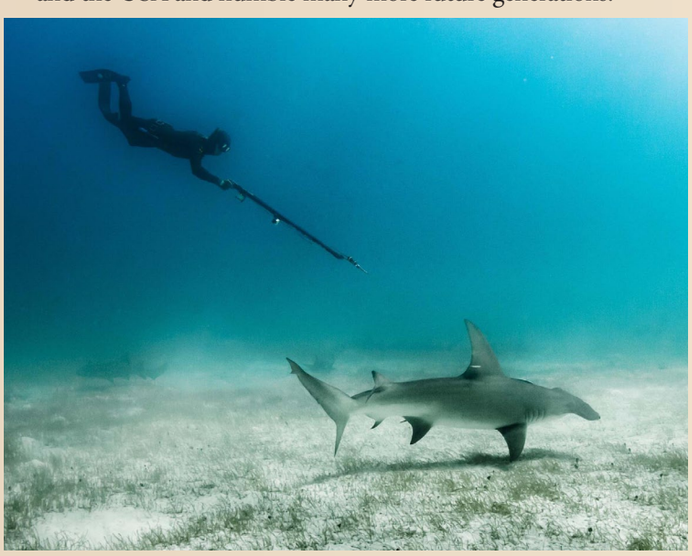


Photo © Lukas Müller

William Winram freediving towards a great hammerhead shark to place an X-Tag.