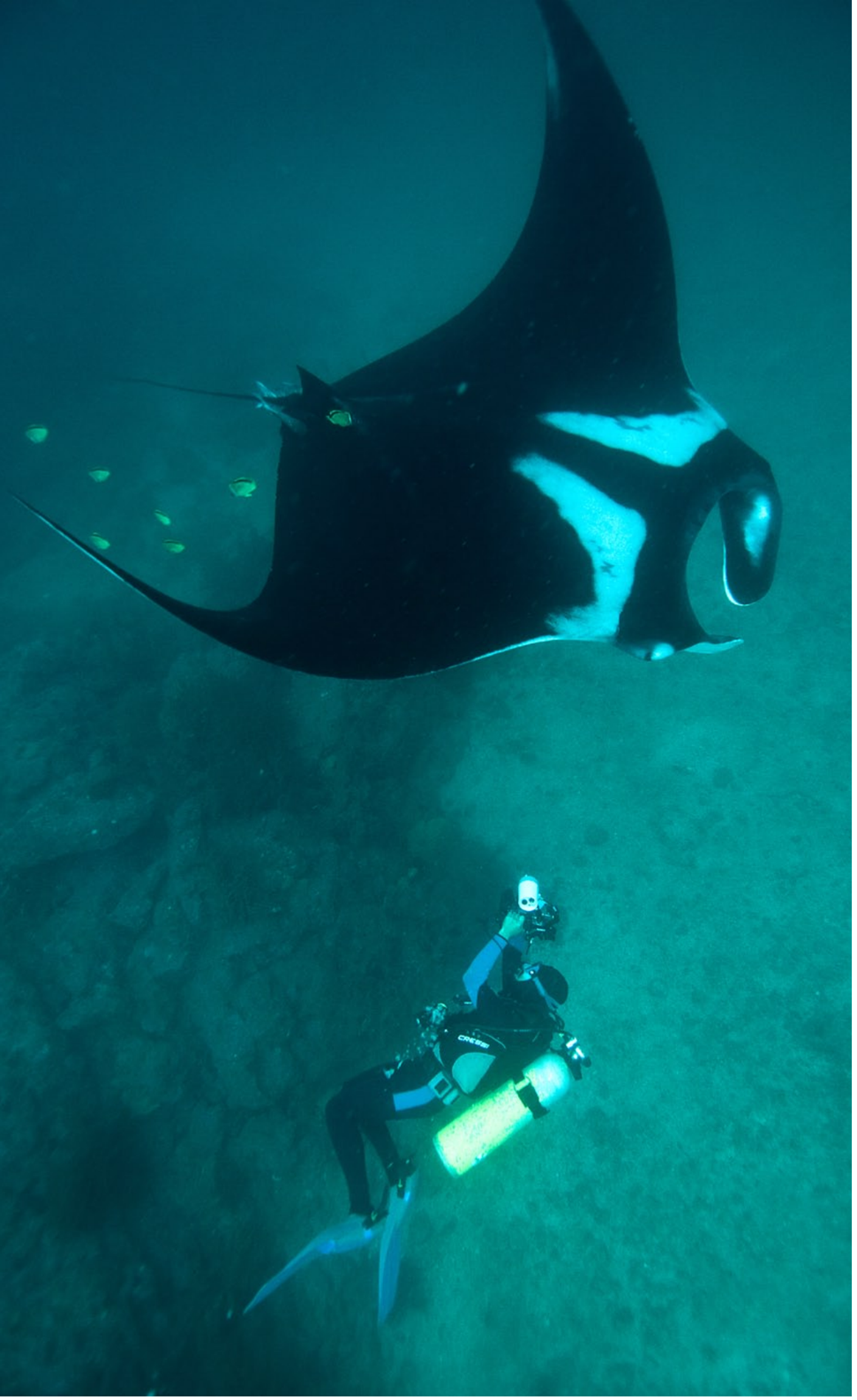
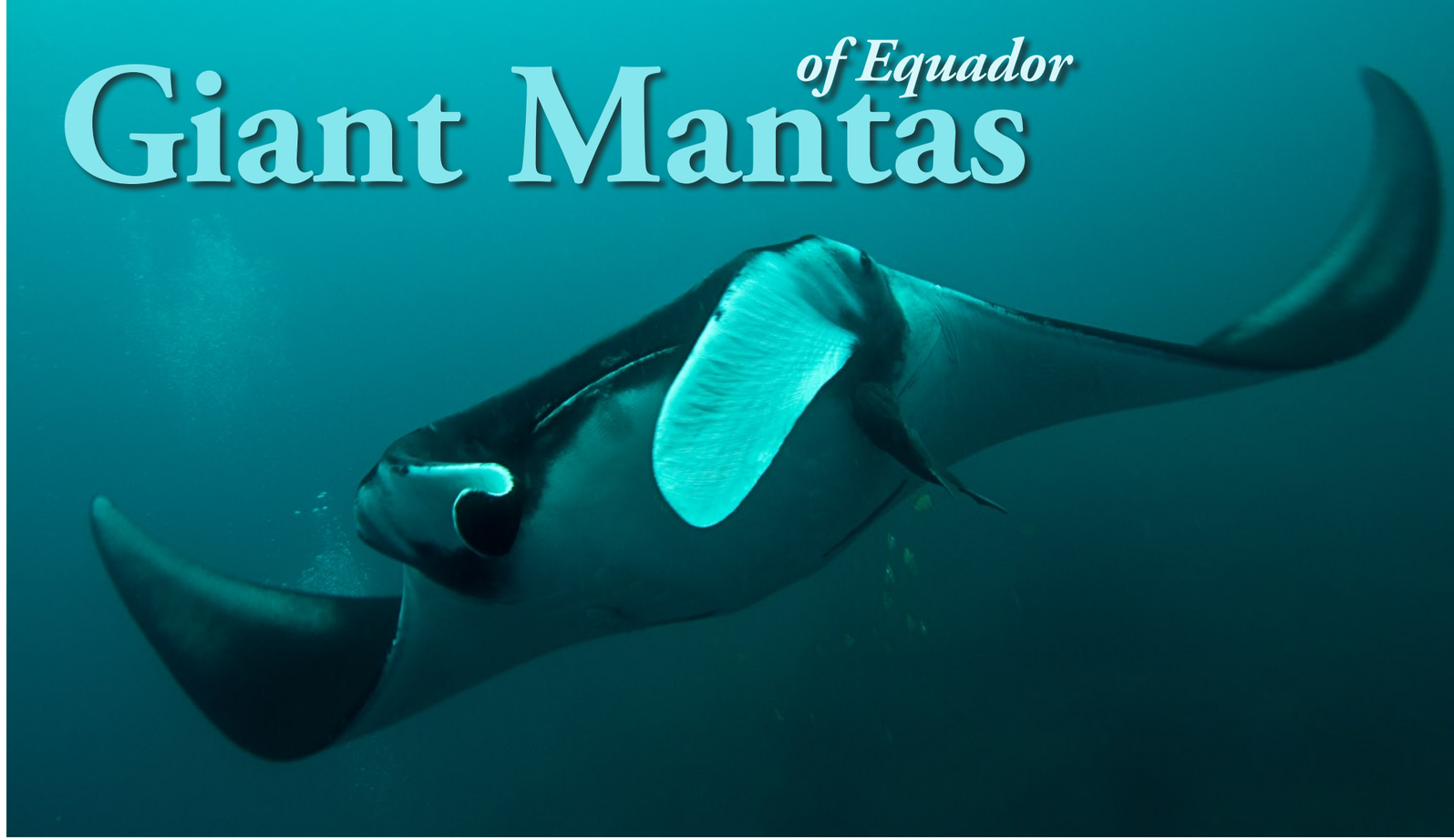
Giant Mantas *of Equador*



Diver takes a photograph for manta identification

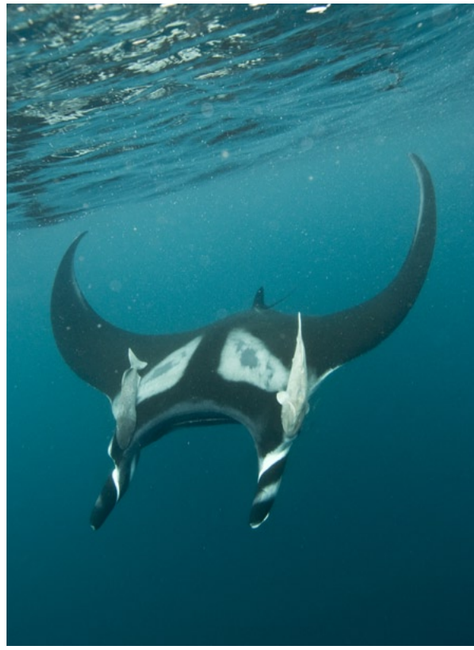


Text and images by Mark Harding

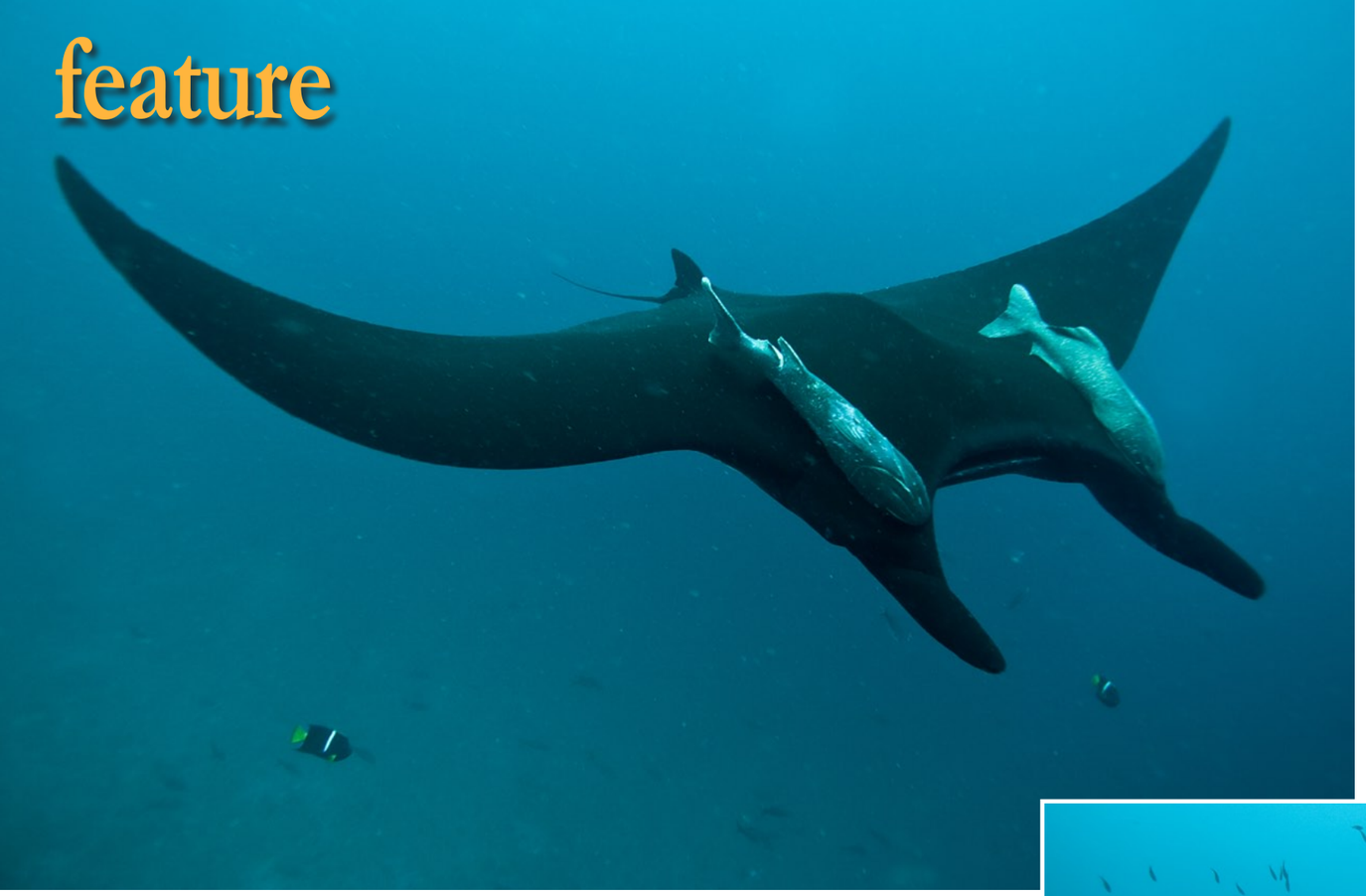
There is a recently developed term making its way into common use amongst the wider dive community, and that term is, *citizen scientist*. The science community is waking up to the fact that the common man and woman are valuable resources for acquiring many missing pieces in the jigsaw puzzle that is marine research, particularly for migratory species. This is the story of my own purely accidental, but now entirely purposeful brush with citizen science and the incredible journey I have been on since discovering what could possibly be one of the largest populations of giant mantas anywhere in the world.

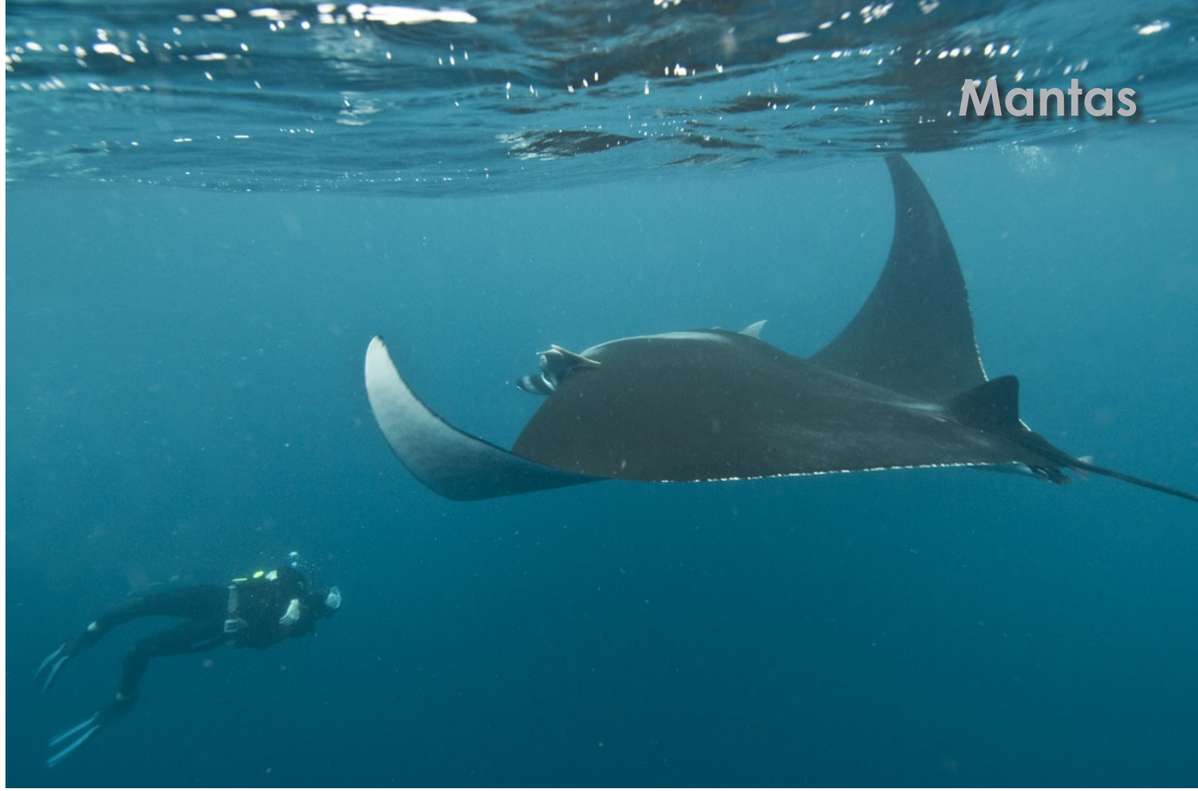
Thousands, if not hundreds of thousands, of divers enter the water every day all over our planet. It seems a waste of a valuable resource not to make use of these myriad eyes, and more importantly, cameras to record what is going on when and where. A prime example is the ECOCEAN database that encourages divers from any walk of life to submit their images. The database lays out the methodology, and the data collected helps piece together sightings worldwide.

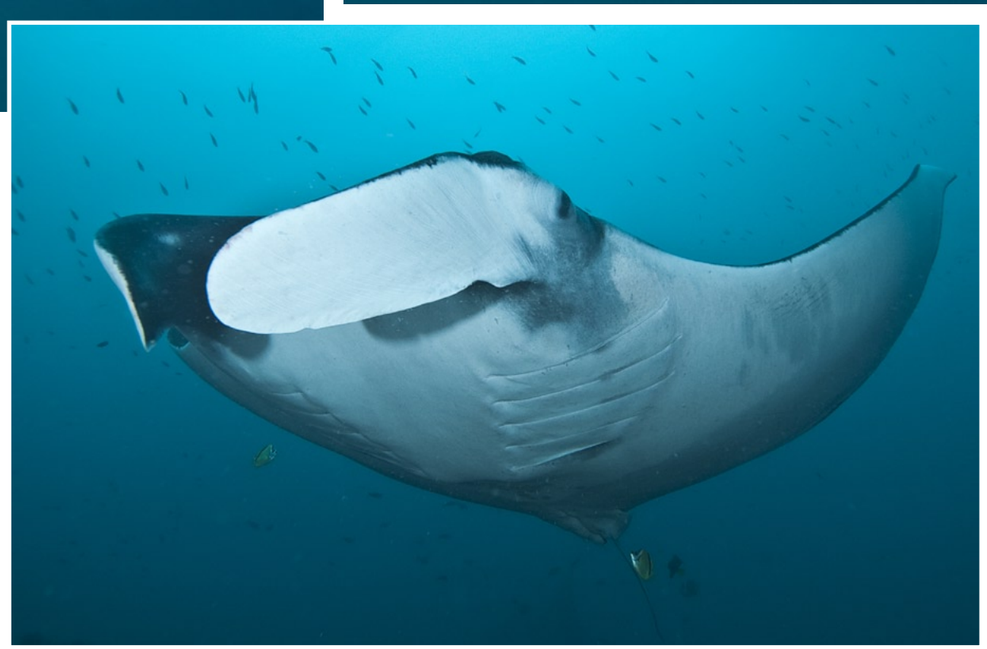
In 2004, for a number of reasons, I decided to sell everything, take a leap into the unknown and go and do something ridiculous. To begin my adventure, I was looking for a country where I could expand my underwater and terrestrial wildlife portfolio and also follow something of a long standing (unrelated) desire to learn the Spanish language. After considering most possibilities, I settled on Ecuador, which fitted both prerequisites perfectly, being as biodiverse as at least any other Latin American country and also one



Manta with remora at the surface







CLOCKWISE FROM FAR LEFT: Black manta with a couple of remora hitching a ride; Diver and manta at the surface; Manta portrait

of the smallest to travel between interesting zones. The coastline seemed at least partly dive-able, and Ecuador was one of the most cost effective places to embark on a long Spanish speaking course. So it was then, and after a rather intensive initial set of weeks in the language classroom, that I decided to take a break to the coast and go diving.

Not having dived many exotic places before, the diving on Ecuador's coast seemed considerably better than that of my murky home waters of the United Kingdom, so I quickly decided this was the place to begin and develop my professional diving career. Although I lived in Quito where I had just met my future wife, I began PADI divemaster and instructor training with one of the coastal dive schools, readily accessible by a short internal flight or not so easily reached by any of the frequently robbed or crashed national bus services.

Meeting a manta

During 2005, I dived quite a lot at Isla de la Plata and quite by chance sighted a giant manta. I shall never forget it.

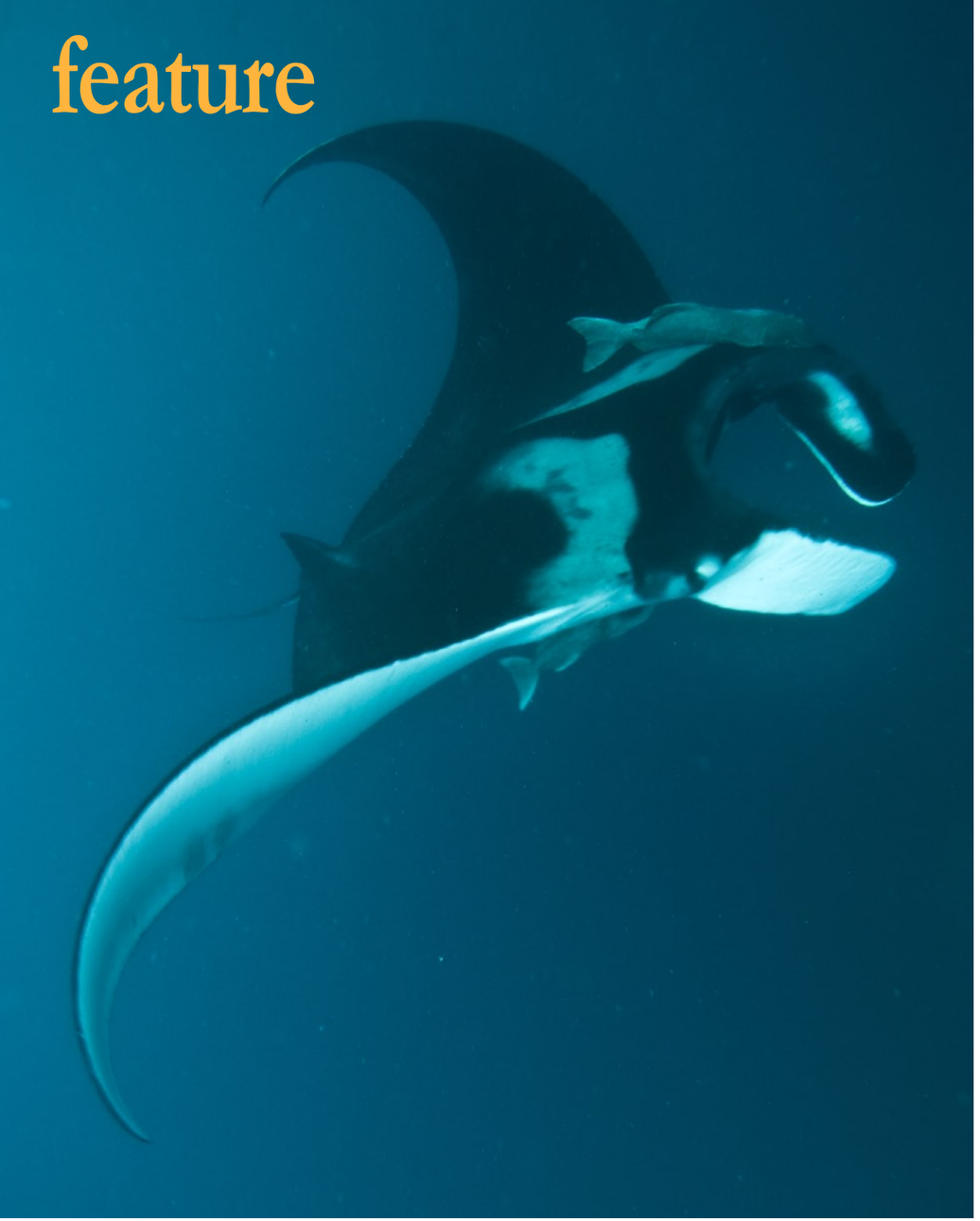
Some of the local guys had said there might be a chance to see them there, but I was expecting something a lot smaller. I distinctly remember that individual. It was one of the less common melanistic or black mantas. Its cephalic fins were unfurled in front of its almost indistinguishable eye, giving it something of an elephantine appearance. It swung about us in two or three sweeping, purposeful passes. It seemed so immense, when it went over our heads it felt like night had fallen. There was an almost ominous, overbearing sentiment to its presence. Then it was gone. The sound of my regulator returned to my senses, hissing and wheezing—a comforting sound after the shattering boom of emotion that had wrung my head of any other thought when I saw that giant black shape.

Once I had settled back on the boat after that dive, my minded drifted back to my childhood when I had first learned of manta rays on television. Jacques Cousteau had described one saying that it appeared to him as a ghost, coming to him out of the gloom from who knows where, and going off to some equally mysterious and unknown place. His words could not have been better spoken. I was mesmerised, not only by the manta's presence, but also the questions that came to my head.

This huge animal, quite obviously not a local resident and by all accounts only ever seen around that area for a couple of months, was full of mystery. I searched in Internet for any information that I could find on them and started to take photos of each individual. Their ventral surface is uniquely marked and if enough information is gathered, population estimates can be made by measuring sightings and comparing re-sightings against new individuals.

Local knowledge was indeed slim on the subject of these mantas, and the general consensus was that there may be something between 20 and 30 individuals (even to this day, it is very unusual to see more than a handful of these mantas at the same time).

Each time I dove the area, I would look



THIS PAGE: Portraits of mantas at depth and at the surface

Mantas

out for and capture photos of the mantas, and my excitement soon mounted. After two seasons of casual attempts at identity shots, I had recorded no less than 40 individuals, and what everyone considered to be the 'one' black manta, turned out to be one of three melanistic mantas at that time. There had to be more.

I recounted my findings to a visiting scientist from the United States, Dr Jim Lehmann who was in the area working on whale migration with local whale researcher, Dr Cristina Castro. Jim was highly supportive of my initial enthusiasm and suggested one way to fund further investigation was to look out for volunteers recently graduated from university, or those looking to volunteer for a gap year. These newly qualified biologists could supply some funding by paying a cost covering fee, and they would also bring some much needed biology knowledge to the field.

Identifying mantas

In 2009, Jim put me in contact with my first volunteer, Stacy Bierwagen who was taking a semester break from her marine biology degree course. During that summer, we got on whatever boat space that was available and spent as many hours on the key sites as we could.

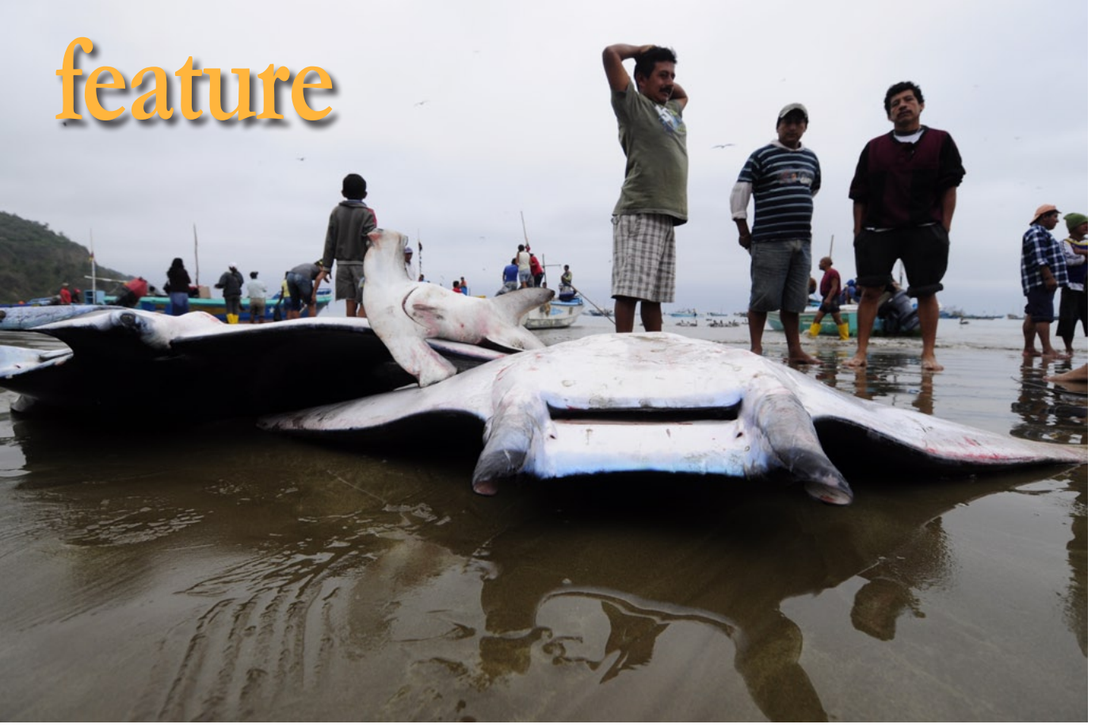
Those early days were simply incredible. On occasions, there were more mantas than we could ID sensibly. Mostly though, the days were a little quieter.

Back then, dive tourism operated off the back of whale watching and walking tours to Isla de la Plata, with divers hitching a lift and diving when the walkers were on the island. Stacy and I were often the only divers in the water, with the mantas to ourselves. Our evenings were spent wading through ID shots collected on these diving days, and at the end of the 2009 season, we compiled a report that was submitted to the Machalilla National Park and Ministry of Environment.

Our conversations during that period were mostly raw and intense. Arguments over reasoning were common as we gleaned what little information we could from sparse Internet articles and the few scientific papers that we had access to.

In the few short years since 2009, it now seems ridiculous how little we knew, or even the world at large knew, about manta rays. One thing we did know was that there were a lot more than 40 mantas in that population. We had collected 101 new ID's in 2009 alone and had not seen one single manta ray from previous years. Our recent accounts showed that we did not re-sight any one manta at the site for more than a handful of consecutive days, meaning each individual was not hanging around for very long.

Our driving force was always what was happening on the beaches, as we made our way from the scruffy streets of Puerto Lopez to the boats. The fisherman's landing zone is in the same place as where all the whale watching tourists board their various craft. The looks on the western faces as they view the carnage is invariably either one of new romanticism beholding the rustic life of the local fisher folk or aghast environmentally aware travellers who are horrified to see row after row of shark and ray bodies hauled from the fibreglass pangas to feed local



LEFT TO RIGHT: Mobulas fished in Ecuador lay on the beach; Catch of sharks, a daily sight on Equador's main fishing beaches; Green sea turtle; Diver removes net from reef off Ecuador

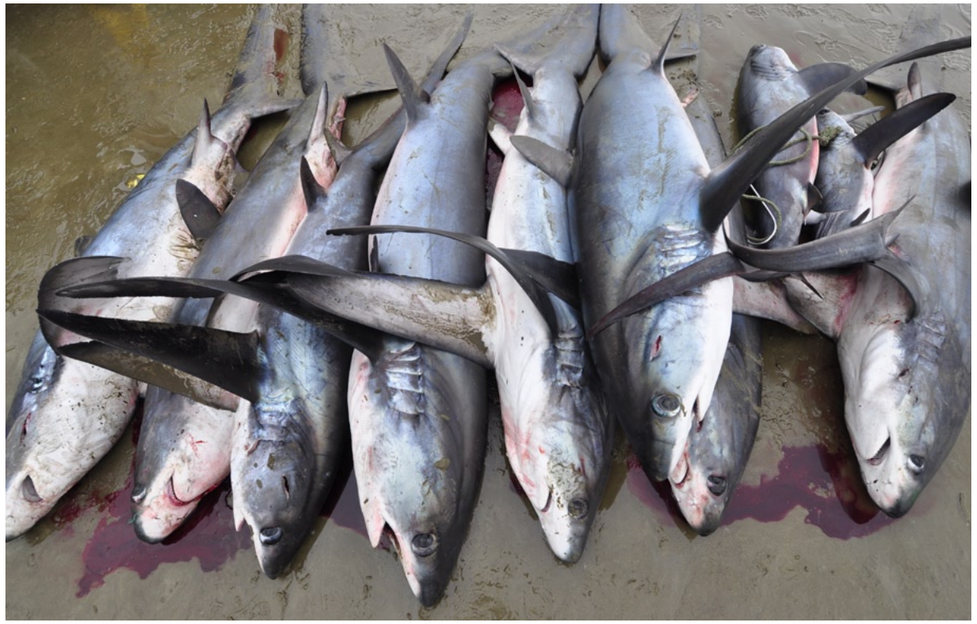
and international trade.

Although manta rays had not been targeted in Ecuador and are now officially protected since 2010, my own feeling back at the outset of my activity was that should the local fisheries decline sufficiently, and should other global manta fisheries also decline, the Ecuadorean artisanal fleet would soon find reason to start tackling the giant mantas on their doorstep.

Discovery

Back at the computer and I was keen to make my findings available to other manta scientists around the world, and a few eyebrows were raised at what I had found. The lack of repeat sightings and number of new mantas found each day (14 new individuals was my best day in 2009) was pointing to a population far greater than the 140 or so we had on our database.

In 2010, I was proud to have attracted the attention of Save Our Seas foundation who funded my project for the first time. I also received three international manta researchers on the project, one of whom was Andrea Marshall who tagged three of our rays as part of her global manta tagging program. A handful of diehard manta fanatics also joined the project that year, and more cameras in the water proved useful. My small team and I managed to capture a further 170 or so new ID's swelling our database to around 320 individuals.



The most interesting aspect of the 2010 data was that it appeared to support our 2009 observation that individual mantas did not hang around for long, again staying for only a few days, with most of them being sighted only the one time.

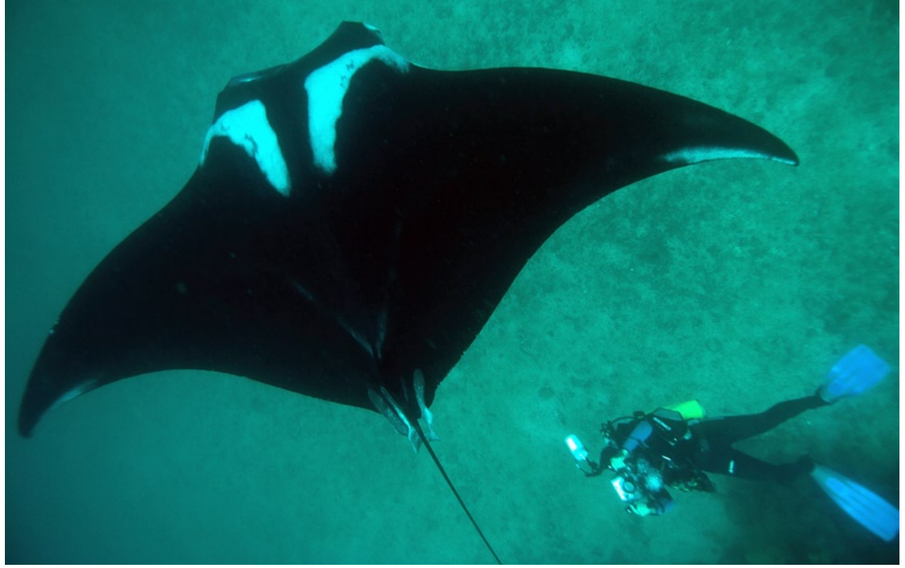
During that year my British team of marine biology volunteers helped mount a simple plankton trawl experiment and we monitored currents, wind direction and noted tide times and moon phases as well as other environmental conditions. These recordings showed interesting results. The mantas in the area definitely respond to one or more key environmental factor influencing either them directly or their food source. This seemed to potentially be one of a number of plankton classes borne on a current system or temperature front.

Whatever that factor was, it was significant enough to divert such a huge number of mantas away from the study sites for a significant number of days, or even months. There were either fantastic numbers of mantas in the area, or none at all. There was nothing in between.

In 2009, with the help of local fishermen, Stacy and I found another cleaning site some 65 kilometres to the south of Isla de la Plata. Significantly, if the mantas depart from Isla de la Plata they also depart from this newly found site within a very short space of time.

The year 2011 was again interesting. In contrast to the previous year they arrived later in the season with no mantas seen at all in July, arriving only in mid August. (The previous year 2010 was the opposite with mantas arriving and leaving earlier). Luckily when the mantas did arrive, we were ready for them.

With even more volunteers arriving on the project, each with a camera this time, the database had reached almost double its number the previous year, and although we have increased our year on year re-sightings to a handful now, the in-year re-sightings remain very low, with most individuals staying around for one day, and a mere handful staying on for a just a few days at a time. There is no doubt that there are a lot of mantas in the area when the migration arrives for its short period. The overriding question now is where does that population go for the rest of the year?



Mantas

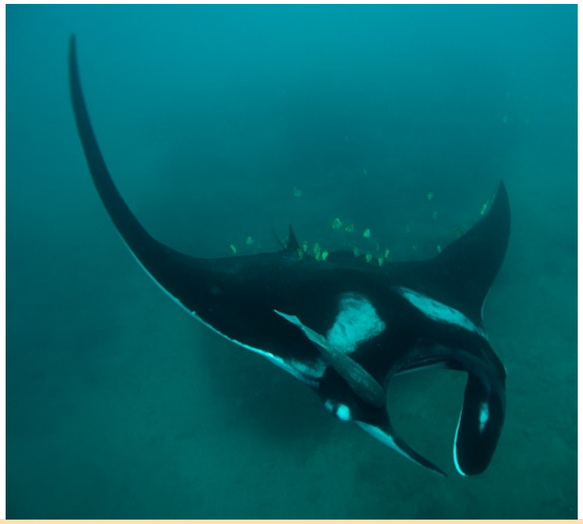
CLOCKWISE FROM FAR LEFT: Curious manta; Diver takes image to identify manta; Example of image that identifies an individual manta and its sex—in this case, male; Manta portrait

Conservation

Although now protected in Ecuador, the mantas are still exposed to considerable risk from indiscriminate fishing practices. Their migration seems to also coincide with the arrival of the Wahoo fishery, and the high speed trolling method that is used by the artisanal fishermen leave many mantas with deep wounds, gouging by large hooks and many are left trailing hundreds of yards of heavy monofilament or braided lines. We have even seen mantas towing 25 litre drums used as floats.

It also remains to be seen how the authorities will deal with the growth of tourism around the mantas. Already in 2011 I saw three diving boats on the sites, with up to 20 divers in the water, a huge increase over 2009 when it was just two of us. The sites most frequented by the mantas at the island are only three main points, and the coral patches on those sites that hold the cleaning fish amount to probably less than two football pitches in total. It is clear that over-diving by too many people will soon trash the sites, as is reported to have happened at other sites around the world. However, some development must be allowed to allow the local communities to benefit from this important resource, lest demand for fishing revenues beat upon the doors of local officialdom.

Ecuador is undergoing something of a political renaissance recently with the stabilising socialism of President Rafael Correa. This new feeling of stability is creating something of a power wave amongst the lower political ranks, and policy enforcement is happening all across the board. It is only hoped at this stage that decisions made in favour of manta ray conservation can be effectively enforced, and any development of the situation can occur without being dogged by the spectre of corruption that has plagued much of the country's history.



As for me, my work in Ecuador has gone some way to protecting mantas around the world, having provided data for the recent IUCN re-assessment of *Manta birostris*, and data and essential communication for the CMS appendix I & II listing for this species. I also contributed to the significant body of work for the Manta Ray of Hope project authored by Shawn Heinrichs and colleagues, which was released just a few weeks ago.

I am currently busy forging new working relationships in Peru, where we have identified a directed manta fishery. The mantas are of the same population, recognised by Peruvian fishermen as coming and going from Ecuador.

The purpose of this article is not to hail my own success, but to hopefully encourage anyone who is reading this to pick up the gauntlet and run headlong into any project that can help grow wider community support for ocean conservation. My own efforts started, and continue, with nothing more than a deeply held belief that passionate attempt does yield result. There are plenty of people out there that will tell you that you are not good enough to carry out that initiative, but it is important only to listen to the tiny handful of people, including yourself, that tell you that you can. ■

Many thanks to the staff and officials of Machalilla National Park, particularly CMS focal point, Julia Cordero, for mobilising the efforts of Ecuador's CMS panel at such terribly short notice. I would also like to thank my dedicated team of marine biologists, mostly from the United Kingdom—Emma Tripp, Katherine Burgess, Tim Reynolds, Christine Skippen—and Stacy Bierwagen from the United States. I would not have been able to do any of this without their ongoing support as well as the support of the Puerto Lopez fishing and diving community.

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