

#01

JAN '21

Exploring the **Marine Megafauna Foundation's** pioneering conservation work

OCEAN GIANTS



**MARINE
MEGAFAUNA
FOUNDATION**

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MMF researcher, Stella Diamant, wearing
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Madagascar

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SAVING OCEAN GIANTS FROM EXTINCTION.

Our mission is to save threatened marine life using pioneering research, education, and sustainable conservation solutions. Our objective is a world where marine life and humans thrive together.



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Madeleine Pierce

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MMF EXPEDITIONS



RAJA AMPAT **PG 13**
TUBBATAHA **PG 31**

PG 03



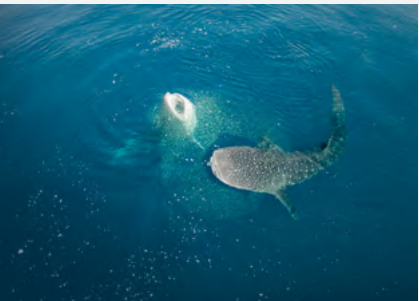
PROTECTING MOZAMBIQUE

PG 15



URBAN MANTAS

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THERE'S NO PLACE LIKE HOME

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ENDANGERED GIANTS

PG 41



SHARKS OF MOZAMBIQUE



Letter from the Founder



WELCOME TO THE FIRST MMF QUARTERLY MAGAZINE. I SUSPECT THAT MOST OF US ARE GLAD TO HAVE 2020 IN THE REAR-VIEW MIRROR.

I’m happy to report that MMF, despite the pandemic, has still been able to get some great work done during the past few months.

In this first issue, we’re highlighting a major marine protection win in Mozambique along with some of our recent research and conservation initiatives. From the urban mantas of Florida to the homebody whale sharks of Tanzania, MMF scientists and their wonderful collaborators have been making new discoveries across the world.

Hopefully, we’ll all be back in the ocean wilderness soon. If you’d like to join us in the field, do note the pages on our upcoming trips scattered through this magazine! Thanks so much for your support, and bring on 2021.

DR. SIMON PIERCE
Co-founder, Principal Scientist



PROTECTING **MOZAMBIQUE**

NEW NATIONAL LEGISLATION
SAFEGUARDS KEY MARINE SPECIES

PHOTOGRAPHY BY
Andrea Marshall, Clare Prebble, & MMF contributors.

“

We can both conserve our incredible fish life and allow people to have a stable livelihood and food source.

– Emerson Neves, MMF



WE ARE THRILLED TO ANNOUNCE a major legislative victory for ocean life in Mozambique, following 20 years of MMF research and lobbying efforts. A new commercial fishing law has enacted sweeping protections for several threatened species, including whale sharks, manta rays, and all other mobula ray species.

This new legislation, which went into effect on January 8th, is a huge step in the right direction for the protection of threatened marine species in Mozambique. We commend the Mozambican government for taking these bold steps to protect the region’s breathtaking sea life, while still supporting the local fishing culture and economy.

“This law will make it far easier for our fishing communities to manage their impact by empowering them to create no-take zones and enforce rules limiting the use of gear that is destructive to important coral reef and mangrove habitats,” says MMF Conservation Project Manager Emerson Neves. “This will help us achieve our goal of sustainable fishing for generations to come, so we can both conserve our incredible fish life and allow people to have a stable livelihood and food source.”

The passing of this law is no small feat and has taken years of scientific research and lobbying by NGOs and institutions, including MMF, to highlight the importance of establishing protections for the threatened marine species in the region. We are grateful that the government has responded to the data and recommendations of scientists in developing these new regulations.

RESEARCH FOR CONSERVATION

MMF has been researching whale sharks and mobulid rays in Mozambique for almost two decades. Our achievements have included the discovery that manta rays are two separate species and the first formal studies of these species in Africa. “The largest identified populations of both reef and giant manta rays in Africa have been identified off the southern Mozambican coastline, making it a critical region for their conservation in the Western Indian Ocean,”

explains MMF Co-founder and Principal Scientist, Dr. Andrea Marshall.

MMF has also led groundbreaking research on whale sharks in the region. Our research into the importance of the whale shark habitat in the area and increasing human pressures, such as accidental catch in gillnets, helped to justify their inclusion in this new law.

“The Mozambican coast is an internationally important habitat for whale sharks, the world’s largest fish,” elaborates Dr. Simon Pierce, MMF Co-founder and Principal Scientist. “Protection in Mozambican waters provides a safeguard for the species locally, where whale sharks are the basis for sustainable marine ecotourism, but will also help these gentle giants to recover in the broader Indian Ocean. The Mozambique government has taken a commendable step for the worldwide conservation of this endangered species.”

Some of the most crucial and troubling data captured by MMF has shown dramatic declines in sightings of marine megafauna like manta, mobula rays, and whale sharks. In 2013 we reported a 79% decline in whale shark sightings and an 88% decline in reef manta sightings, and sadly these trends continue. Updated data now show declines of over 90% for giant mantas, reef mantas, and shortfin devil rays in the south of the country.

“Evidence of these stark declines, which have been attributed in large part to localized fishing pressure, is a testament to the urgency of these new protections,” states Dr. Marshall.

A GIANT OPPORTUNITY

MMF researchers have estimated the economic importance of manta rays and other megafauna to the Mozambican tourism industry, highlighting the economic incentive for their protection. The study, lead-authored by Dr. Stephanie Venables a senior scientist at MMF, illustrated the economic impact of manta ray tourism in the Inhambane province, including US\$34 million per year for manta ray tourism, and a projected yearly loss of \$16–25 million if Mozambique were to lose manta rays.

Healthy populations of megafauna are crucial for maintaining healthy oceans. Manta rays and whale sharks are all listed as threatened species with declining populations worldwide. Local conservation measures, which this law helps enable, are vital for the overall persistence of these species. Every organism plays an important role in an ecosystem, but ocean giants play vital roles in maintaining balance and regulating resources in their environments.

“

Evidence of these stark declines, which have been attributed in large part to localized fishing pressure, is a testament to the urgency of these new protections.

– Dr. Andrea Marshall, MMF





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The Mozambican coast is an internationally important habitat for whale sharks, the world's largest fish.

– Dr. Simon Pierce, MMF

“

We’re hoping to use the positive momentum ... to add protection for hammerhead sharks, smalleye stingrays, leopard sharks, and wedgefish, among other vulnerable species.

– Dr. Andrea Marshall, MMF



This in turn, naturally keeps fish populations healthy and improves the viability of fishing industries into the future. In addition to the protection granted to mantas, mobulas, and whale sharks, the law also includes the following new regulations:

- Fishers must land the full body of any sharks caught with fins attached.
- New clearer regulations for CCPs (community fishing councils).
- A ban on destructive fishing practices on coral, seagrass, or mangroves.
- A ban on the harvesting of live coral.
- Bycatch must be thrown back unless you have prior written permission to use it for research.
- Turtle excluder devices are mandated on industrial and semi-industrial nets.

LOOKING FORWARD

While this law is a significant breakthrough, a number of other important species are still at risk. “This new protection is a huge step in the right direction and we’re thrilled that Mozambique is recognizing the importance of some of the species we study, but there are other rare and endangered species in Mozambique that still lack protection,” explains MMF Manta Research Manager, Anna Flam.

“We’re hoping to use the positive momentum from this new law, combined with our research, to lobby Mozambique to add protection for hammerhead sharks, smalleye stingrays, leopard sharks, and wedgefish, among other vulnerable species.”

MMF is currently working with other NGOs to submit a list of species that we believe must be added as an amendment to the new law.



ANNA FLAM

MMF scientist



Join us in the field!

MMF EXPEDITIONS

RAJA AMPAT

26 MARCH – 05 APRIL 2021

03 – 13 MARCH 2022

We are excited to welcome you onboard this expedition of a lifetime as we explore Raja Ampat, home to the richest coral reef ecosystem in the world, during peak manta ray season.

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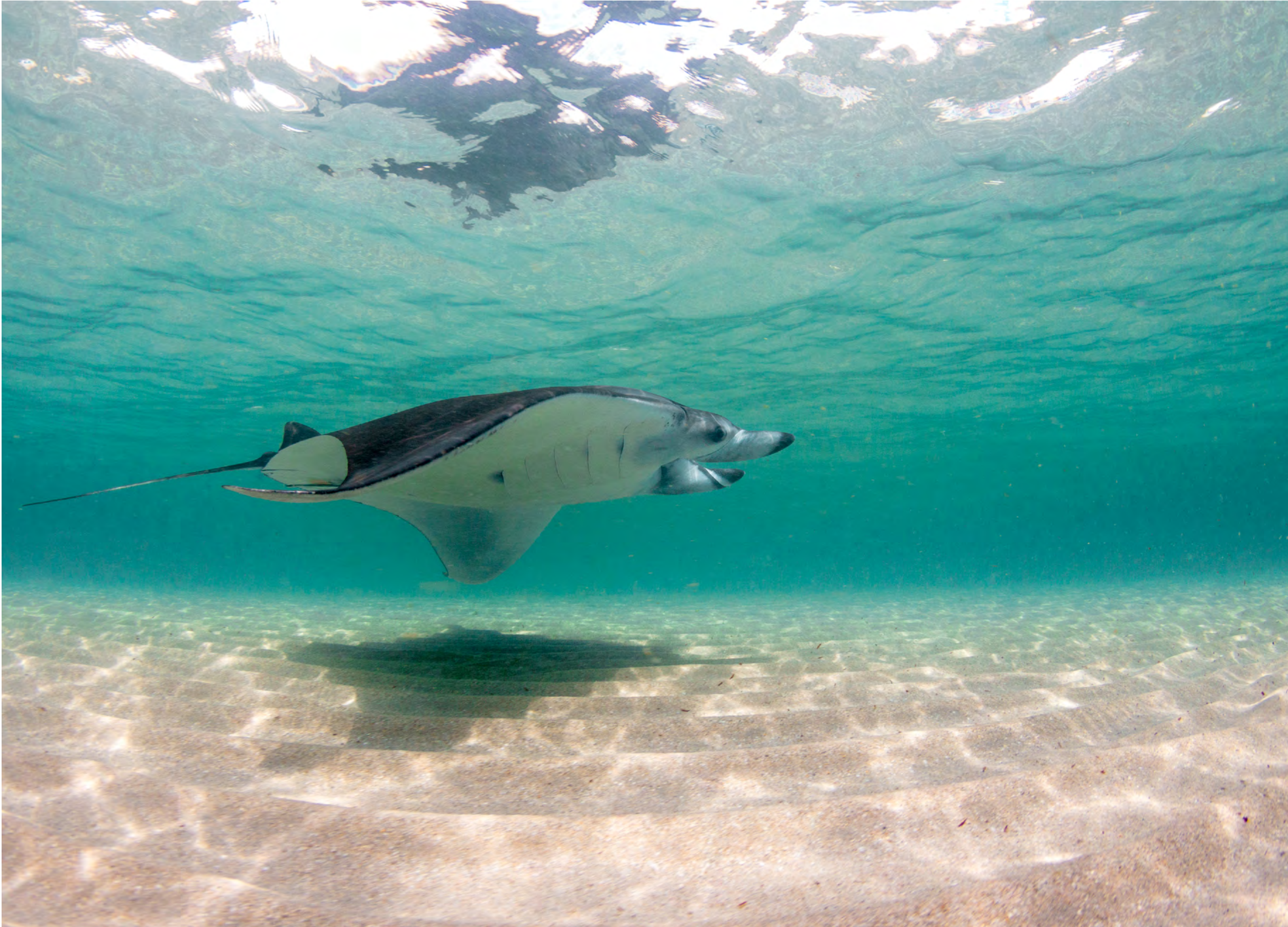




URBAN **MANTAS**

A POTENTIAL NURSERY GROUND FOR
MANTA RAYS MAY BE UNDER THREAT
OFF SOUTHEASTERN FLORIDA

PHOTOGRAPHY BY
Jessica Pate & Bryant Turffs



THE FIRST STUDY ON MANTA RAYS off the coast of Florida, published by Endangered Species Research, has discovered a potential urban nursery ground for manta rays.

Juvenile manta rays are regularly sighted in the shallow waters along Florida’s coastline. This is the first time a nursery habitat has been discovered in such a highly developed urban environment.

Conducted over a four year period, the study revealed that almost all mantas sighted were juveniles. Individuals use the habitat throughout and between years, both of which are key definitions of a nursery ground.

“Manta rays are rarely seen by divers on Florida’s reefs and most divers are surprised to learn that we have a potential manta nursery ground along our coast,” said the lead author of the study, Jessica Pate from MMF. “In many places, manta rays are seen at remote cleaning stations within coral reefs systems or feeding offshore. Here in Florida, we regularly see manta rays swimming in 5 ft of water over the sand in front of multi-million dollar mansions, high rise hotels, and apartment blocks. They rest in man-made inlets and feed at the mouths of inlets which have heavy boat traffic.”

FOUR YEARS OF STUDY

Researchers from MMF conducted surveys between 2016–19 to better understand the manta rays found in Florida’s waters. Across 175 boat-based surveys, the team reported 150 manta ray encounters and identified 59 individual manta rays (which were added to the online global manta ray database: <https://www.mantamatcher.org/>). Almost all of the manta rays sighted were juveniles (98%) and 42% of manta rays were observed more than once.

“Very few nursery habitats for manta rays have been identified, and this is the first to be found in such an urban environment,” explains Dr. Andrea Marshall, co-founder and a Principal Scientist at MMF. “We were immediately concerned for the safety of these small juveniles who appear



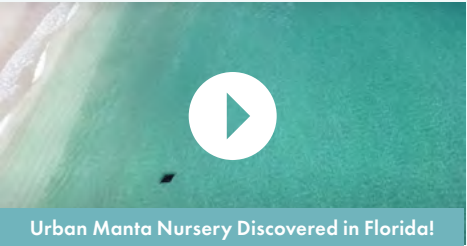
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Here in Florida, we regularly see manta rays swimming in 5 ft of water over the sand in front of multi-million dollar mansions, high rise hotels, and apartment blocks.

– Jessica Pate, MMF

WATCH THE VIDEO

Featuring spectacular drone footage of mantas in their urban Floridian habitat.



to use the highly populated coastline of southeastern Florida during the first years of their lives. They face so many threats in this area, intense boat traffic, recreational fishing, raw sewage, and toxic algal blooms. The list goes on and on.”

A key observation from the study is the frequent anthropogenic impacts experienced by the mantas along this coastline, particularly fishing line entanglement and vessel strikes. Of the manta rays observed, 27% of the individuals were entangled in fishing line, and many of these mantas experienced multiple entanglements. Vessel strikes were also evident, with 30% of manta ray injuries clearly caused by a boat propeller. The study also documented rapid wound healing, with deep propeller injuries completely closing within just a few weeks. That means injuries are likely to be underestimated in this population.

A NEW SPECIES OF MANTA?

The population of manta rays in Florida is comprised of the potential new third species of manta that is yet to be formally described. Scientists from MMF are currently working on deepening our understanding of this species.

“Manta rays are highly vulnerable and we know very little about this presumed new species,” said Dr. Andrea Marshall, who originally discovered the presence of this probable new manta ray species off Mexico in 2010.

“It is tragic to think that the Floridian population, one of the largest we currently know about, is subject to so many anthropogenic pressures. This project was designed to rapidly assess more about Florida’s mantas so that better management plans can be developed.”

As the survey area for the study only covered a small portion of the Florida coastline, the full extent of the nursery habitat is still unknown. MMF’s future research will use satellite and acoustic telemetry, aerial surveys, and plankton tows to understand the physical and biological features of the potential nursery habitat. MMF’s researchers are currently developing education materials aimed at helping fishermen and boaters understand the situation, which in turn will hopefully reduce these harmful impacts on manta rays.

This research was made possible by generous funding from the Kansas City Zoo, Brevard Zoo Quarters for Conservation Grant, Our Children’s Earth Foundation, and the Zoos and Aquariums Committing to Conservation Grant. Many wonderful volunteers also contributed their time and skills to make this research possible!



JESSICA PATE
*Founder and Lead Scientist,
Florida Manta Project, MMF*



**THERE'S NO PLACE
LIKE HOME**

WHALE SHARKS IN TANZANIA
STICK AROUND FOR MONTHS,
OR EVEN YEARS, AT A TIME.

PHOTOGRAPHY BY
Simon Pierce

GLOBAL LOCKDOWNS pose few problems for whale sharks off Tanzania. New research shows that these gigantic fish prefer to stay in the bay they call home.

Scientists regard whale sharks as a “highly migratory” species, capable of swimming tens of thousands of kilometers each year. However, a study published by MMF researchers in the journal *Frontiers in Marine Science* has shown that at least one site, Mafia Island in Tanzania, they like to stay local.

“I’ve worked on whale sharks all over the world, and I’ve never seen anything like it,” said the lead author of the study, Dr. Chris Rohner from MMF. “We usually have to track whale shark movements via satellite. Here, in Tanzania, many of the sharks kept returning to a single bay over months, and across years.”

Whale sharks are the world’s largest cold-blooded animal, growing to 20 m in length, more than 30 tons in weight, and potentially living for over a century. Despite their huge size, these sharks feed solely on plankton and small fishes, and pose no threat to people.

“We used passive acoustic ‘pinger’ tags for this study. Every minute or so, the tags transmit a coded ultrasonic burst that travels around 300 m through the water,” explained Dr. Jesse Cochran, a co-author on the study, working with the King Abdullah University of Science and Technology. “We placed receivers through Kilindoni Bay. As the sharks swam past, the tag code would tell us which shark it was, and when it was there.”

WHY DO WHALE SHARKS LOVE MAFIA?

Kilindoni Bay, on the inshore coast of Mafia Island, is close to the mouth of the Rufiji River delta. “We think the river delivers a lot of nutrients into these coastal waters, which makes it a highly productive area. There are huge densities of small shrimp in the warmer months, and that’s when we’d see the sharks enjoying the buffet,” said Dr. Rohner.

Mafia Island is an important feeding ground for juvenile whale sharks. The researchers monitored the movements

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*I’ve worked on whale sharks
all over the world, and I’ve
never seen anything like it.*

– Dr. Chris Rohner, MMF





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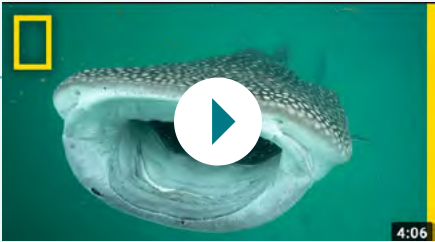
Before long, we realized we were seeing many of the same sharks every year. These days, it's like visiting old friends.

– Dr. Clare Prebble, MMF



WATCH THE VIDEO

NATIONAL GEOGRAPHIC
on MMF's work at Mafia Island



of 51 whale sharks through the Kilindoni Bay receiver array over five years.

"We see lots of sharks on the surface feeding on shrimp between November and February," said Dr. Clare Prebble from MMF. "Before long, we realized we were seeing many of the same sharks every year. These days, it's like visiting old friends."

What the scientists didn't anticipate was that their data showed many of the sharks stayed in, or close to the bay, across the whole period of research.

"These sharks are real homebodies," said Dr. Rohner. "By the end of the study, we had almost 200,000 detections on our receivers. We expected to see plenty of sharks in the warm months, but we didn't think they'd hang around afterward."

The sharks use a small area close to shore over summer, while they're feeding on the shrimp. Then they move slightly offshore and spent less time at the surface in the cooler months.

Mafia Island is also an important area for fishing. The whale sharks are traditionally viewed as 'lucky' by the fishermen, as the fishes they're targeting often travel with the sharks.

"The fishermen and whale sharks generally have a good relationship off Mafia Island," said Dr. Baraka Kuguru from the Tanzanian Fisheries Research Institute. "The fishers use nets to catch small fish, but the small-mesh nets don't tangle the sharks. The sharks normally swim straight out and resume feeding. We even see them feeding in the nets sometimes. It all seems to work quite well."

AN UNHAPPY TREND

In the last few years though, more threats to the sharks have emerged. "We're seeing increasing boat traffic off Mafia, and the sharks are getting hit," said Dr. Simon Pierce from MMF. "That's certainly a concern, but worse – a small number of fishermen have started setting big gillnets to catch rays, right in the middle of the whale shark feeding area."

The researchers recommend that whale shark management fees, a mandatory per-person contribution from tourists swimming with the sharks, are shared with fishing communities to compensate them for avoiding the sharks' main feeding area while the shrimp are present.

"The core 'home range' of the sharks' summer activity is only about 23 km²," added Dr. Pierce. "It's a small area, but it's super important to the sharks."

"We've long been interested in what the whale sharks are doing at Mafia," said Jason Rubens, who initiated the study through the primary funder, WWF Tanzania. "The island is embracing ecotourism in addition to fishing, and there's a great opportunity to create sustainable livelihoods while also protecting the sharks."

"Whale sharks are globally endangered," said Dr. Rohner. "By ensuring they're safe in vital feeding areas like Mafia Island, we're giving them the best possible chance to recover fast. This staycation could really work out in their favor."



DR. CHRIS ROHNER

MMF Principal Scientist,
Global Whale Shark Program



Join us in the field!

MMF EXPEDITIONS

TUBBATAHA REEFS

04 – 11 MARCH 2023

Climb aboard the Philippines' premier Liveaboard **Atlantis** and explore one of the world's most remote and vibrant coral reef ecosystems. Join MMF's Founders and Principal Scientists **Dr. Andrea Marshall** and **Dr. Simon Pierce**.

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ENDANGERED
GIANTS

GIANT MANTA RAYS NOW LISTED
AS AN ENDANGERED SPECIES

PHOTOGRAPHY BY & COURTESY OF
Andrea Marshall



THE GIANT (OR OCEANIC) MANTA RAY

(*Mobula birostris*) has been uplisted to Endangered on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species. An endangered listing is reserved for species with grave conservation concerns. This announcement serves to confirm what we have long suspected – this gentle marine giant is finding it hard to cope with intensifying anthropogenic pressures around the globe. The giant manta ray now joins over 16,000 endangered species to be assessed with this serious threat level. At this stage, 30% of sharks and rays are threatened with extinction.

The past two decades have been devastating for this species. Targeted for their gill plates – which they use to filter feed on small zooplankton from the water column – the unrelenting and increasing demand for their body parts has fueled both existing and emerging target fisheries. The relatively new Asian-based trade seems to be impacting the giant manta more than other species of manta ray, with the unsustainable harvesting decimating their populations across the globe.

GLOBAL DECLINES

Dr. Andrea Marshall, co-founder of MMF, was the lead author of this new assessment for the IUCN. She has been involved in their assessments since 2003. “The giant manta ray is a classic example of a species that is quickly

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*It is such an honor to
have been able to study
and describe this species.
The realization that the
giant manta ray is now in
danger of extinction is a
hard pill to swallow.*

– Dr. Andrea Marshall, MMF



succumbing to human-induced pressures. When we first assessed manta rays in 2003 there simply was not enough information on the species to determine their conservation status and they were listed as ‘Data Deficient’, but on each of the subsequent assessments, their conservation status increased steadily from Near Threatened, to Vulnerable, and now to Endangered. Their current status is a direct result of unsustainable pressure from fishing, which now threatens to destabilize their populations across the globe.”

To curb the burgeoning trade in their body parts to Asia and to encourage more comprehensive conservation strategies for their populations around the world, the giant manta ray was listed on two of the most important global conservation treaties, the Convention on Migratory Species in 2011 and the Convention on the International Trade in Endangered Species in 2013.

Sadly, their numbers have continued to decline. “Manta rays simply cannot withstand such pressures on their populations,” Dr. Marshall explains. “They have an extremely conservative reproductive strategy. They reach sexual maturity relatively late in life, they give birth to a single offspring every few years in the wild, they do not look after or defend their young and the offspring themselves are vulnerable when they are small and may not survive. In other words, as a species, they simply cannot reproduce fast enough to build back their numbers once they are depleted.”

TOURISM DRAWCARD

This iconic species is not only important from an ecological perspective; giant mantas also provide vast economic benefits to tourism industries around the world. “Interactions with manta rays are highly sought after by dive and snorkel tourists globally and contribute millions of dollars to tourism economies each year, particularly in developing nations. At this pivotal time, recognizing their economic value may help to encourage the protection of this enigmatic and now endangered species” explained Dr. Stephanie Venables, a Senior Scientist at MMF.

The giant manta ray was only formally described by Dr. Marshall and colleagues in 2009. At the time it was one of the largest species to be described in our oceans and the announcement was met with excitement around the globe.

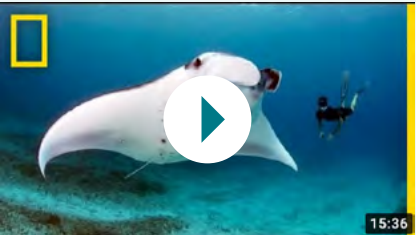
“It is such an honor to have been able to study and describe this species. The realization that the giant manta ray is now in danger of extinction is a hard pill to swallow”, Dr. Marshall admits. “We are still busy learning about this extraordinary creature and we have only scratched the surface. There is so much more we need to understand, but at this stage, we have put that all aside in favor of protecting the last remaining populations of giant mantas across the globe.”



DR. ANDREA MARSHALL
MMF Co-founder & Principal Scientist

WATCH THE VIDEO

Andrea Marshall: Queen of the Manta Rays.
Nat Geo Live





MMF COLLABORATES ON A
GLOBAL SURVEY OF REEF SHARKS

PHOTOGRAPHY BY & COURTESY OF
Andrea Marshall, Anna Flam, Global Finprint

SHARKS **OF MOZAMBIQUE**

A LANDMARK STUDY PUBLISHED IN NATURE BY GLOBAL FINPRINT has revealed that sharks are virtually absent on many of the world’s coral reefs, indicating they are too rare to fulfill their normal role in the ecosystem; they are “functionally extinct.” Of the 371 reefs surveyed in 58 countries, sharks were not observed on nearly 20%, indicating a widespread decline that has gone undocumented on this scale until now.

Essentially no sharks were detected on any of the reefs of six nations: the Dominican Republic, the French West Indies, Kenya, Vietnam, the Windward Dutch Antilles, and Qatar. Among these, a total of only three sharks were observed over more than 800 survey hours.

WORK IN MOZAMBIQUE

The Marine Megafauna Foundation supported the Mozambique fieldwork, where they found that sharks were likely to be observed in around three-quarters of surveys. Alexandra Watts, an MMF / Manchester Metropolitan University scientist who co-authored the study, noted “While this result might sound positive, our surveys were conducted within, and close to the Bazaruto Archipelago National Park, established in 1971. Even here, reef sharks are far less common than we would expect to see in a healthy coral reef ecosystem. These field results were then related to known social and economic factors that influence shark declines, such as the proximity and density of the nearest human populations, along with government regulations and compliance. Including these elements, along with their capacity for change, provided a regional conservation potential for reef shark recovery.”

“It was disheartening to see Mozambique place in a middle-tier for global reef shark presence,” said Anna Flam, an MMF scientist who participated in the study. “However, seeing the significant gains possible for shark conservation with simple management practices, I cannot wait to redouble our conservation efforts with local communities. This study validates our local approach, and provides increased evidence for changes we have long pursued,

such as reef closure areas and gill net bans.”

This first-ever benchmark for the status of reef sharks around the world, funded by the Paul G. Allen Family Foundation, revealed an alarming global loss of these iconic species that are important food resources, tourism attractions, and top predators on coral reefs. Their loss is due in large part to overfishing of sharks and their prey, with the single largest contributor being indiscriminate fishing practices, such as the use of longlines and gillnets.

“Although our study shows substantial negative human impacts on reef shark populations, it’s clear the central problem exists in the intersection between high human population densities, destructive fishing practices, and poor governance,” said Dr. Demian Chapman, Global FinPrint co-lead and Associate Professor in the Department of Biological Sciences and Institute of Environment at Florida International University. “We found that robust shark populations can exist alongside people when those people have the will, the means, and a plan to take conservation action.”

GLOBAL BEST PRACTICE

The study revealed several countries where shark conservation is working, and the specific actions that can work. The best-performing nations, compared to the average of their region, included Australia, the Bahamas, the Federated States of Micronesia, French Polynesia, the Maldives, and the United States. These nations reflect key attributes that were found to be associated with higher populations of sharks: being generally well-governed, and either banning all shark fishing or having strong, science-based management limiting how many sharks can be caught. “These nations are seeing more sharks in their waters because they have demonstrated good governance on this issue,” said Dr. Aaron MacNeil, lead author of the Global FinPrint study and Associate Professor at Dalhousie University. “From restricting certain gear types and setting catch limits, to national-scale bans on catches and trade, we now have a clear picture of what can be done to limit catches of reef sharks throughout the tropics.”

“

Our surveys were conducted within, and close to, the Bazaruto Archipelago National Park. Even here, reef sharks are far less common than we would expect to see in a healthy coral reef ecosystem.

– Alexandra Watts, MMF



An aerial photograph of a coastal landscape. In the foreground, there is a large body of water with varying shades of blue and green, indicating different depths and possibly seagrass beds. Several small, elongated islands and peninsulas are scattered across the water, covered in dense green vegetation, likely mangroves. The islands are connected by narrow channels and sandbars. In the background, the water extends to a distant, flat horizon under a clear sky. A few small boats are visible on the water, and a long, thin structure, possibly a pier or breakwater, extends from one of the islands into the water.

“

A network of well managed MPAs along this coastline could safeguard the remaining populations of these important predators.

– Dr. Andrea Marshall, MMF

WATCH THE VIDEO

GLOBAL FINPRINT'S
Shark footage highlights



LOOKING FORWARD

Dr. Andrea Marshall, a Principal Scientist and co-founder at MMF, maintains there is hope for sharks in eastern Africa: “While many of the local shark and ray populations have been greatly reduced in southern Mozambique over the last two decades, healthy populations remain in some protected areas like the Bazaruto Archipelago National Park. It gives us hope that a network of well-managed MPAs along this coastline could safeguard the remaining populations of these important predators.”

The FinPrint team is wrestling with the fact that conservation action on sharks alone can only go so far. Researchers are now looking at whether recovery of shark populations requires management of the wider ecosystem to ensure there are enough reef fish to feed these predators.

“Now that the survey is complete, we are also investigating how the loss of sharks can destabilize reef ecosystems,” said Dr. Mike Heithaus, Global FinPrint co-lead and Dean of the College of Arts, Sciences & Education at Florida International University. “At a time when corals are struggling to survive in a changing climate, losing reef sharks could have dire long-term consequences for entire reef systems.”

Launched in the summer of 2015, Global FinPrint’s data were generated from baited remote underwater video stations (BRUVS) that consist of a video camera placed in front of a standard amount of bait – a “Chum Cam.” Coral reef ecosystems were surveyed with BRUVS in four key geographic regions: the Indo-Pacific, Pacific, the Western Atlantic, and the Western Indian Ocean.

Over the course of four years, the team captured and analyzed more than 15,000 hours of video from surveys of 371 reefs in 58 countries, states, and territories around the world. The work was conducted by hundreds of scientists, researchers, and conservationists organized by a network of collaborators from Florida International University, the Australian Institute of Marine Science, Curtin University, Dalhousie University, and James Cook University.

For more information and a new global interactive data-visualized map of the Global FinPrint survey results, visit <https://globalfinprint.org>.



ANNA FLAM
MMF scientist



ALEXANDRA WATTS
MMF & Manchester Metropolitan University scientist



DR. CHRIS ROHNER
Principal Scientist,
Global Whale Shark Program

THE GALAPAGOS



Shark Research Insights & Photography Dive Liveaboard

This liveaboard expedition will be led by shark scientist and photographer Dr. Chris Rohner. Chris is one of the world's foremost whale shark researchers and is part of the Galapagos Whale Shark Project team. Joining this liveaboard will provide you with a unique opportunity to discover the very latest in whale shark research, while onboard workshops will provide you the opportunity to learn how to get the best out of your underwater camera gear.

07 - 14 JUN 2022 - US\$ 4,490
15 - 22 AUG 2023 - US\$ 4,490

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DR. ELITZA GERMANOV
Senior Scientist,
Manta Ray Program

KOMODO



Manta Ray Research, Coral Triangle & Dragons

This resort-based trip will be led by Indonesian manta expert Dr. Elitza Germanov. Komodo National Park isn't just home to the world's largest lizard, the Komodo dragon; over 1,000 manta rays frequent these idyllic tropical waters. Komodo is located within the Coral Triangle, the world's most healthy and biodiverse coral reefs. This trip will allow you to learn more about the latest manta ray research while diving or snorkeling spectacular reef systems. And, of course, visiting the dragons!

26 OCT - 02 NOV 2021 - US\$ 2,490
31 OCT - 07 NOV 2022 - US\$ 2,490

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DR. CLARE PREBBLE
Senior Scientist,
Global Whale Shark Program

MEXICO



Whale Shark Research & Photography

This resort-based trip will be led by whale shark scientist and photographer Dr. Clare Prebble. Each year, just north of Isla Mujeres in Mexico, whale sharks come together for one of the world's most amazing spectacles as they gorge themselves on tiny, energy-rich tuna eggs. We will be joining Mexican whale shark researcher Rafael de la Parra and his team to search for and conduct research on this aggregation – for you, we hope that will mean snorkeling with hundreds of whale sharks!

18 - 24 JUL 2021 - US\$ 2,890
18 - 24 JUL 2022 - US\$ 2,890
24 - 30 JUL 2022 - US\$ 2,890

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STELLA DIAMANT
Founder,
Madagascar Whale Shark Project

MADAGASCAR



Whale Shark Research, Marine Life & Lemurs

This resort-based trip will be led by whale shark scientist and photographer Stella Diamant, founder of the Madagascar Whale Shark Project. Aqua-Firma provided seed funding in 2016 to help start a whale shark research project in northwest Madagascar. Now, with over 400 identified whale sharks, the area is well and truly on the map as one of the world's best places to see whale sharks. Madagascar is famous for terrestrial wildlife too and you'll also have the chance to meet lemurs, chameleons, and other weird and wonderful forest life.

14 - 21 OCT 2021 - US\$ 2,490
13 - 20 OCT 2022 - US\$ 2,550

[LEARN MORE](#)



DR. CHRIS ROHNER
Principal Scientist,
Global Whale Shark Program

TANZANIA



Whale Shark Research, Photography & Coral Reefs

This resort-based trip will be led by whale shark scientist and photographer Dr. Chris Rohner, Principal Scientist at MMF. Mafia Island is one of the world's most important research sites for whale sharks, and also part of the "Western Indian Ocean Coral Triangle", with some of the world's most diverse coral reef systems. We'll be snorkeling with whale sharks, often as they're chomping shrimp in huge mouthfuls, and also exploring Mafia Island Marine Park with its coral life and incredible "muck diving", including seahorses and frogfish.

28 NOV - 06 DEC 2021 - US\$ 2,990
27 NOV - 05 DEC 2022 - US\$2,990

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UPCOMING EXPEDITIONS

Aqua-Firma has been a preferred travel partner of MMF since 2012.
These trips help fund our conservation efforts.



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www.aqua-firma.com



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