

MARINE MEGAFAUNA FOUNDATION

ANNUAL REPORT 2021



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This report, along with other information about MMF, is available online at www.marinemegafauna.org

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Centro de Investigação Científica Megafauna Marinha
Associação Megafauna Marinha
Praia do Tofo, Inhambane, Mozambique

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All contributions are tax-deductible in accordance with US tax law.

The Associação Megafauna Marinha is also a registered not-for-profit association in Mozambique.

Graphic Design: Madeleine Pierce

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FROM OUR CO-FOUNDERS

Dr. Simon Pierce & Dr. Andrea Marshall



The past year hasn't been a normal one, but we've learned plenty about building resilience, in both our programs and funding. We're immensely grateful to the long-term supporters that have supported MMF's work throughout.

Well, it'll be news to nobody that things did not return to normal in 2021. Much of our global fieldwork has remained on pause, due to the pandemic and associated challenges, but it was still a huge year for MMF programs. It's been a real pleasure to collate all these successes in this annual overview.

In Mozambique, we started the year with the announcement that manta rays and whale sharks had been granted legislative protection, and ended the year with Inhambane Seascape becoming a global 'Hope Spot' for ocean wildlife – technically announced in January 2022, but don't kill our buzz. There were lots more achievements in between, too, including the creation of Inhambane's first locally-managed marine area following years of consultations by our hard-working conservation team.

Across the world, the Florida Manta Program continues to go from strength to strength, scientific capacity-building work in Indonesia has been supercharged by recruiting great students and interns, and lockdown boredom for some of our scientific team through 2020 led to lots of new discoveries being published in 2021, along with a new textbook on whale sharks. We're now working with many more species, including multiple sharks, rays, and even marlin, continuing our core mission of protecting the world's most endangered ocean wildlife

The past year hasn't been a typical one, but we've learned plenty about building resilience, in both our programs and funding. We're immensely grateful to the long-term supporters that have supported MMF's work throughout. We also welcome, and thank, the many people and organizations who have joined our mission through 2021. And we wi-five our friends and collaborators working in international marine conservation around the world.

Here's to healthy oceans, and a busy year ahead!



Dr. Simon Pierce



Dr. Andrea Marshall



2021 MAJOR IMPACT #1



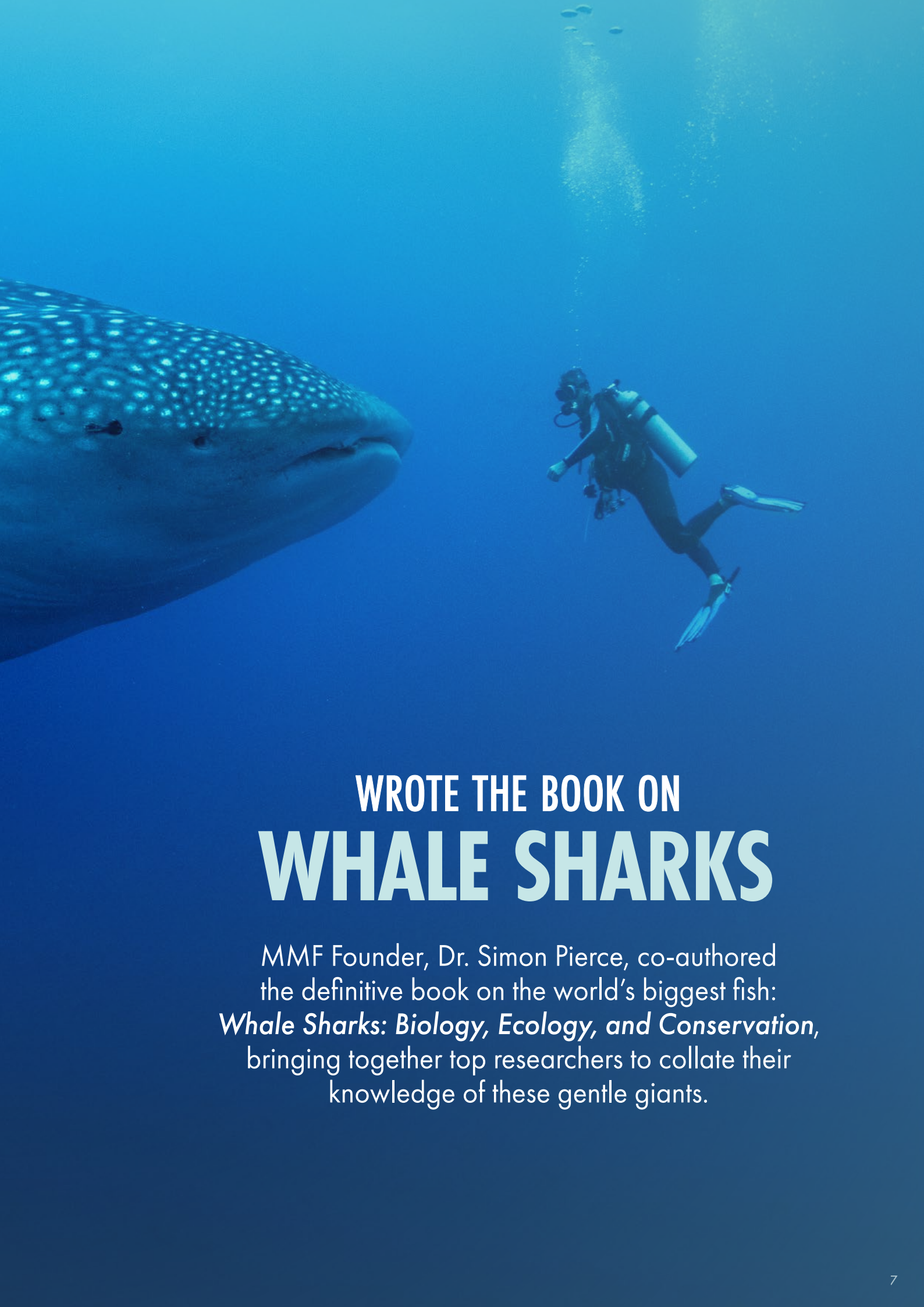
NEW GLOBAL HOPE SPOT

Mozambique's Inhambane Seascape was declared a Mission Blue global 'Hope Spot' for the ocean, based on MMF's research and conservation work (announced in Jan '22).

Photo by Uli Kunz



2021 MAJOR IMPACT #2



WROTE THE BOOK ON

WHALE SHARKS

MMF Founder, Dr. Simon Pierce, co-authored the definitive book on the world's biggest fish: ***Whale Sharks: Biology, Ecology, and Conservation***, bringing together top researchers to collate their knowledge of these gentle giants.



2021 MAJOR IMPACT #3



SAVING PELAGIC SHARKS & RAYS

MMF Founder, Dr. Andrea Marshall, co-authored a *Nature* paper documenting a global 71% decline in pelagic sharks and rays since 1970 – and how we can help them recover.



PROTECTING GALAPAGOS

MMF's collaborative research informed the expansion of the Galapagos Marine Reserve protected area, and a swimway was created through to Cocos Island off Costa Rica to protect whale sharks and other endangered ocean wildlife.

2021 MAJOR IMPACT #4

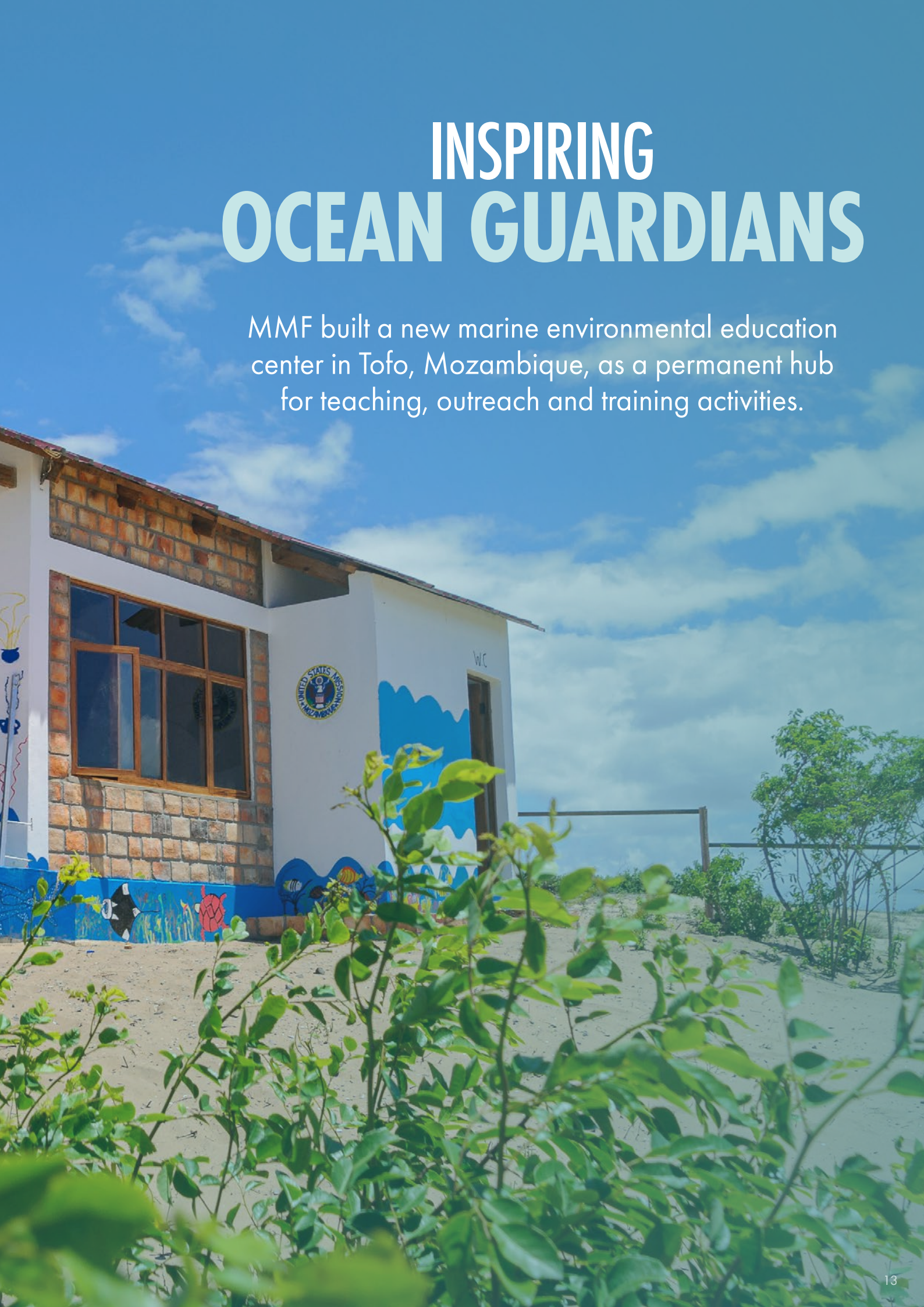

CRESSI



2021 MAJOR IMPACT #5

INSPIRING OCEAN GUARDIANS

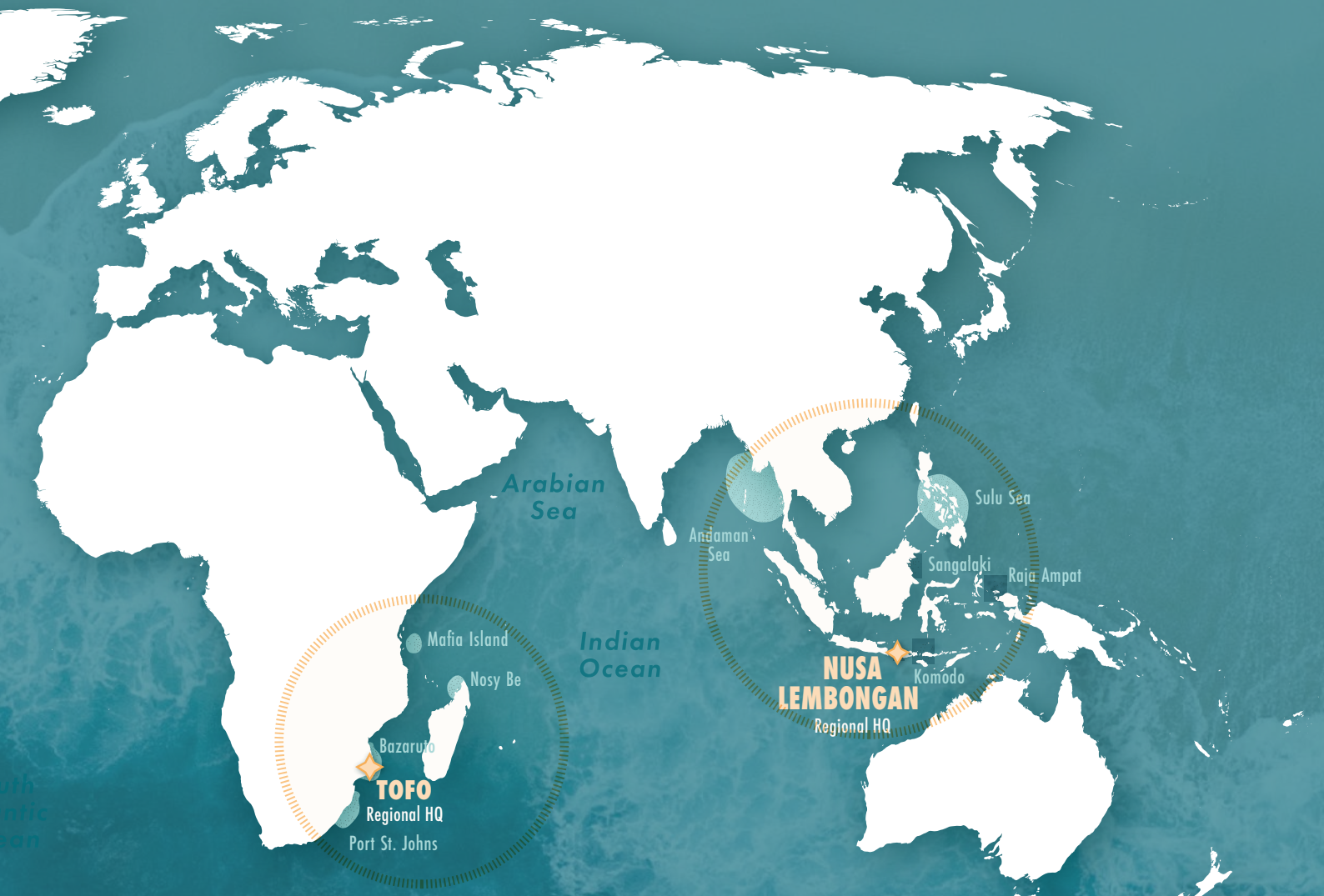
MMF built a new marine environmental education center in Tofo, Mozambique, as a permanent hub for teaching, outreach and training activities.



OUR THREE PRIORITY REGIONS

Americas • Western Indian Ocean • South East Asia





MMF was founded in 2009 by renowned marine scientists Dr. Andrea Marshall and Dr. Simon Pierce to further their mission to save the world's ocean giants from extinction. Since then, many others have joined the team. The organization has expanded to worldwide research, education, and outreach on marine megafauna conservation.

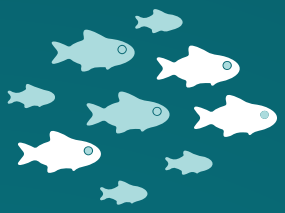
Our team has conducted pioneering work on sharks and rays, particularly manta rays and whale sharks, which has helped these species move towards global protection. These iconic animals are also excellent flagships for the marine environment.

Our work has broad benefits for the other lesser-known endangered species that share their habitats and the creation and management of protected areas to ensure their survival.

Our work focuses on strategic locations with large or otherwise important populations – such as breeding areas – of threatened marine species. We work to develop effective conservation solutions that minimize human threats to marine life, we work with communities to create sustainable livelihoods so they benefit from a healthy marine environment, and we build national science capacity to help ensure long-lasting monitoring and management.



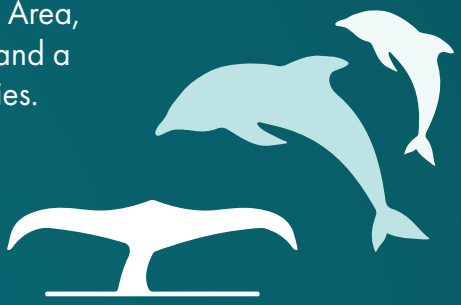
MOZAMBIQUE CONSERVATION



EXPANDING MARINE PROTECTION

283 hectares of ocean now included in Barra's new Locally Managed Marine Area, through a permanent net-fishing ban and a 6-month trial closure of other fisheries.





OCEAN AMBASSADORS

38 community leaders have been trained to promote education and awareness of marine conservation solutions.

FISHERIES MANAGEMENT

Co-Management Committee was formed for community-based fisheries in Tofo/Barra/Rocha region, and legal recognition achieved for the Barra Fisheries Council.



CONSERVATION STRATEGY

developed for the proposed marine protected area expansion of the Pomene Special Reserve.

IMPROVED LIVELIHOODS

120 households with improved livelihoods overall, and 18 alternative careers created through business assistance and apprenticeship programs to reduce dependance on fishing.





MMF RESEARCHERS, LED BY DR. ANDREA MARSHALL (SHOWN HERE), HAVE STARTED A MAJOR NEW RESEARCH PROJECT ON CRITICALLY ENDANGERED RHINO RAYS IN MOZAMBIQUE.



MMF RESEARCHERS PUBLISHED THE FIRST STUDY ON ZEBRA SHARKS IN AFRICA IN 2021, AND ARE NOW TRACKING THEIR MOVEMENTS ALONG THE COAST.







MOZAMBIQUE RESEARCH

NEW RESEARCH STATIONS

Two new satellite field stations in place along the Inhambane coast, and a new dedicated research vessel in Vilanculos.





TRACKING MOVEMENTS

Tags deployed on 5 shark and ray species along the Inhambane coast (see overleaf).



MANTA SPYCAMS

600 hrs of footage from our remote underwater cameras installed on manta ray cleaning stations.



REEF MONITORING

205 Remote Underwater Video surveys on 31 different reefs, and 69 eDNA samples collected.

RESEARCH TRAINING

Three new Mozambican divers trained and qualified for scientific surveys.





10 NEW
ACOUSTIC RECEIVERS

EXPANDED THE

MOZAMBIQUE TRACKING NETWORK

WE TAGGED

2 ZEBRA SHARKS

5 BULL SHARKS

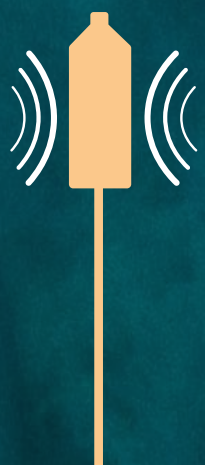
6 RHINO RAYS

4 SMALLEYE STINGRAYS











LUKAS MUELLER AND TEAM IMPLANTING A 10-YR ACOUSTIC TRACKING TAG IN A MOZAMBICAN BULL SHARK.

Photo by Uli Kunz



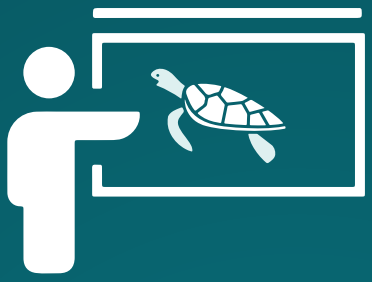




THE POORLY-KNOWN SMALLEYE STINGRAY IS NOW THE FOCUS OF A NEW RESEARCH STUDY BY MMF IN MOZAMBIQUE, INCLUDING THE FIRST ACOUSTIC AND SATELLITE-LINKED TAGS TO EVER BE DEPLOYED ON THIS UNIQUE SEMI-PELAGIC SPECIES.



MOZAMBIQUE EDUCATION



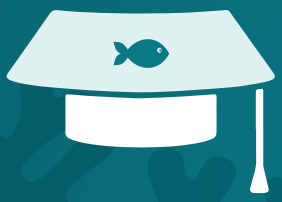


9
SCHOOLS

have worked with MMF in Mozambique from 2012–21.

2,946
MINI MARINE CONSERVATIONISTS

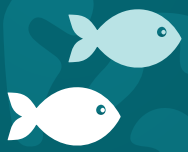
have gone through the MMF curriculum from 2012–21.



11
ECOTOURISM GRADUATES

from MMF's Coral Reef Club Vocational Program have secured paid internships for a career in marine tourism from 2012–21.





967
NEW SWIMMERS

trained by MMF from 2012–21.

> *I am part of the Coral Reef Club program because it provides learning opportunities for young people like me, helping us to think out of the box to solve problems and actively participate in decision-making in our communities. I am passionate about the program because it is very innovative and we learn how to conserve the environment and, at the same time, we receive vocational training. This really motivates me to stay in the program.*
>
> **Palmira, Coral Reef Club Graduate**


NEVER
SAY
NEVER



THE CORAL REEF CLUB DECORATING MMF'S NEW MARINE EDUCATION CENTER IN TOFO.

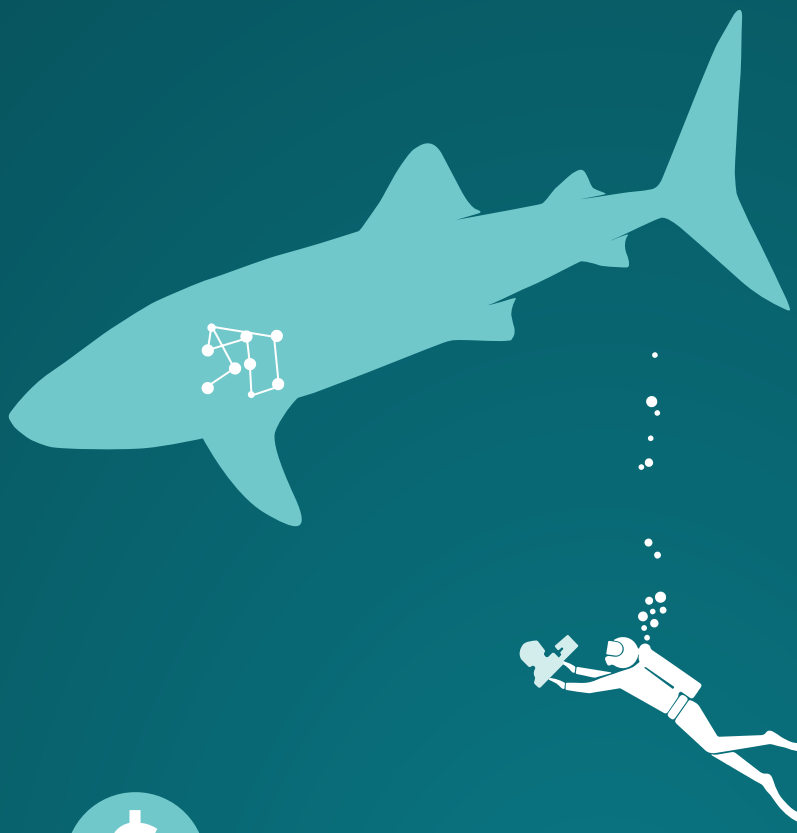


A GRADUATING CLASS OF SWIMMERS FROM MMF'S PROGRAM IN TOFO, MOZAMBIQUE.





MADAGASCAR HIGHLIGHTS



423
NEW SHARKS

identified from 2015 to 2021 near Nosy Be in NW Madagascar.

SHARK
ECOTOURISM

valued at US$1.5 million during the 3-month whale shark season, providing a strong economic rationale for species and habitat protection.











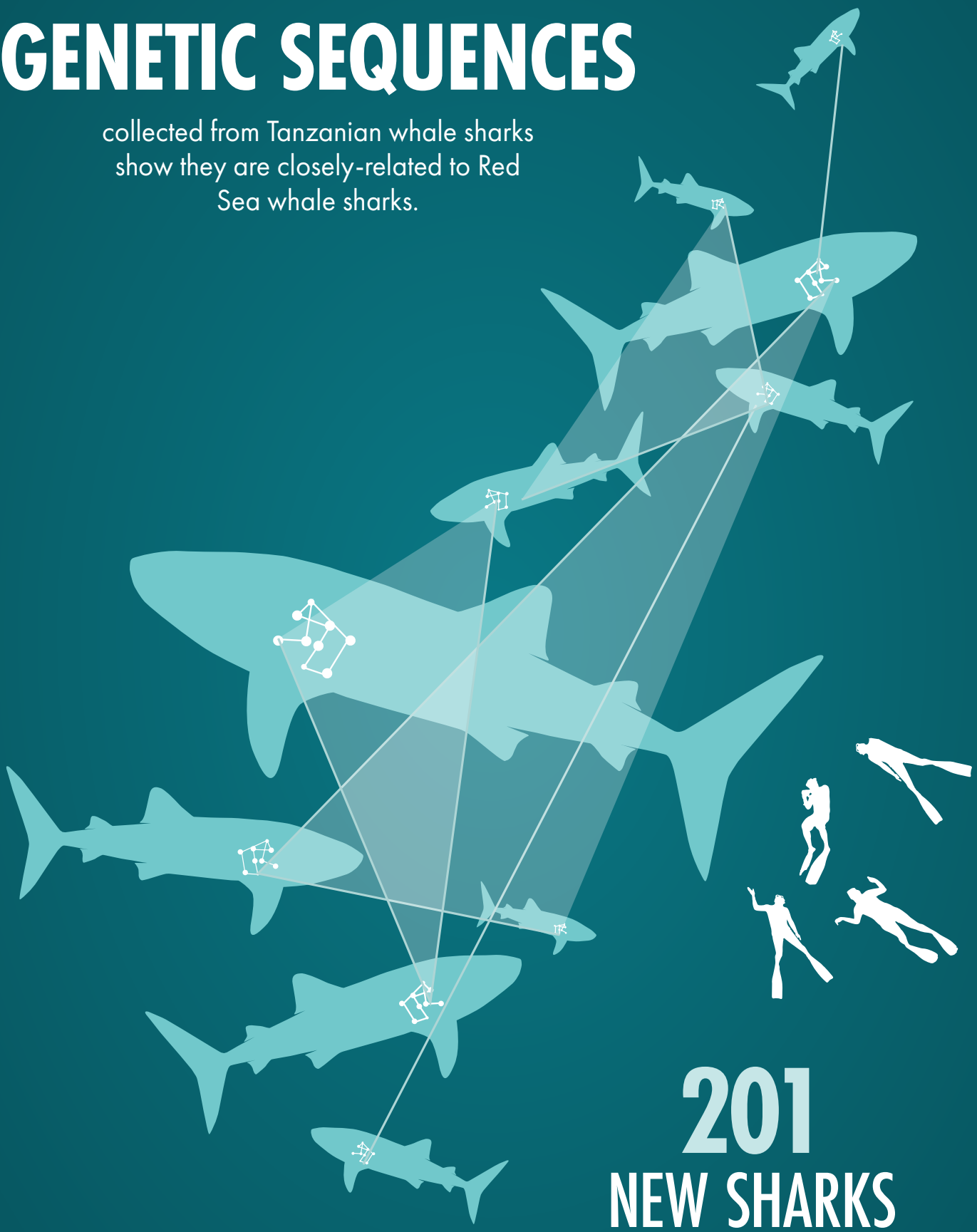
FOUNDER OF THE MADAGASCAR WHALE SHARK PROJECT, STELLA DIAMANT, LASER-MEASURING A TAGGED SHARK OFF NOSY BE.



TANZANIA
HIGHLIGHTS

72
GENETIC SEQUENCES

collected from Tanzanian whale sharks show they are closely-related to Red Sea whale sharks.



201
NEW SHARKS

identified from 2012 to 2021 at Mafia Island, which is a small, highly-resident, but stable population.



KENYA HIGHLIGHTS

Photo by Henley Spiers



2

SCIENTIFIC PAPERS
PUBLISHED

39

BLACK MARLIN

tracked up to 11,944 km over
5.5 months.

40

STRIPED MARLIN

tracked up to 9,187 km over
6 months.



INDONESIA HIGHLIGHTS

4
INDONESIAN RESEARCHERS

trained in marine science techniques from Udayana University, Padjajaran University and Bandung Institute of Technology.

3,289
MANTA RAYS

now identified by MMF Indonesia from four areas through the country.





128
LASER MEASURED

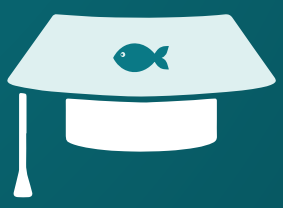
manta rays in Nusa Penida.

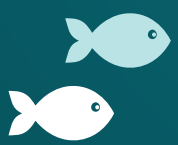


6
PLASTIC SURVEYS

in manta and turtle feeding areas around Nusa Penida, for the 6th consecutive year of monitoring.

FULBRIGHT SCHOLAR





MMF researcher Janis Argeswara (left) is off to the US for her MSc degree on manta reproduction, thanks to the American Indonesian Exchange Foundation.

MMF RESEARCHERS HAVE BEGUN A NEW SEA TURTLE PHOTO-IDENTIFICATION PROJECT AT NUSA PENIDA, NEAR BALI.









MMF SENIOR SCIENTIST, DR. ELITZA GERMANOV, PUBLISHED TWO NEW SCIENTIFIC STUDIES ON THE INSIDIOUS THREAT OF PLASTIC POLLUTION.

Photo by Brooke Pyke



FLORIDA HIGHLIGHTS

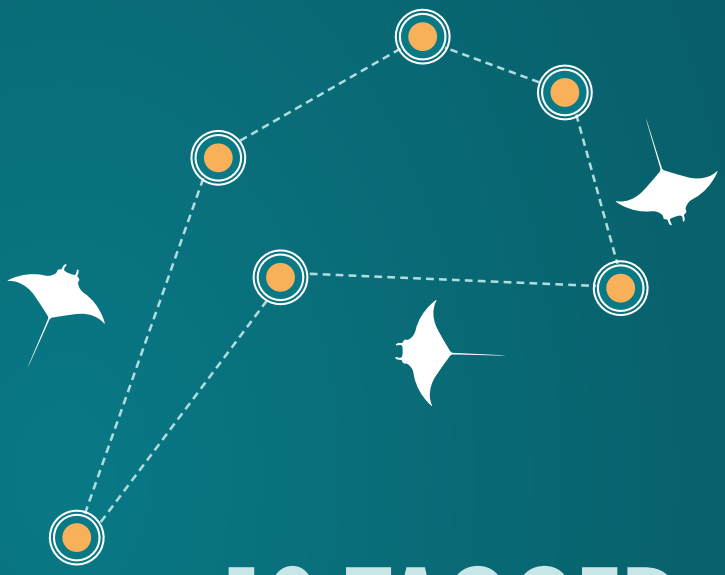


125 MANTA RAYS

now identified by
the MMF Florida team.

24 AERIAL SURVEYS

of manta rays around the
Florida coastline.







10 TAGGED MANTA RAYS

with acoustic and satellite tags,
in collaboration with NOAA.

2,000 VIEWS

of our conservation videos aimed at
boaters, fishers, and divers.





7 LESSON PLANS

designed by the Florida Manta Project
to educate the next generation of ocean
conservationists.



FOUNDER OF THE FLORIDA MANTA PROJECT, JESSICA PATE FROM MMF, HAS DISCOVERED THAT THE FLORIDA COAST IS A NURSERY AREA FOR YOUNG MANTA RAYS.





RESEARCH OUTPUT

2021 SCIENTIFIC PAPERS

Regional variation in anthropogenic threats to Indian Ocean whale sharks.

Reynolds SD, Norman BM, Franklin CE, et al. Global Ecology and Conservation.

***Rhincodon typus* (Green Status assessment).**

Pierce SJ, Grace MK, & G Araujo. The IUCN Red List of Threatened Species.

Population structure, residency and abundance of whale sharks in the coastal waters off Nosy Be, north-western Madagascar.

Diamant S, Pierce SJ, Rohner CA, et al. Aquatic Conservation: Marine and Freshwater Ecosystems.

Microplastics in fecal samples of whale sharks (*Rhincodon typus*) and from surface water in the Philippines.

Yong MMH, Leistenschneider C, Miranda JA, et al. Microplastics and Nanoplastics 1: 1–9.

Half a century of global decline in oceanic sharks and rays.

Pacoureau N, Rigby CL, Kyne PM, et al. Nature 589: 567–571.

Economic value and public perceptions of whale shark tourism in Nosy Be, Madagascar.

Ziegler J, Diamant S, Pierce SJ, Bennett R, and J Kiszka. Tourism in Marine Environments.

Quantifying the distribution and site fidelity of a rare, non-commercial elasmobranch using local ecological knowledge.

Pottie S, Flam AL, Keeping JA, Chivindze C, and Bull JC. Ocean & Coastal Management 212:105796.

Movement ecology of black marlin *Istiompax indica* in the Western Indian Ocean.

Rohner CA, Bealey R, Fulanda BM, Everett JD, Richardson AJ, and SJ Pierce. Journal of Fish Biology.

What's in the soup? Visual characterization and polymer analysis of microplastics from an Indonesian manta ray feeding ground.

Argeswara J, IG Hendrawan, IGBS Dharma, and E Germanov. Marine Pollution Bulletin 168: 112427.

WHALE SHARKS: BIOLOGY, ECOLOGY, & CONSERVATION.

Dove ADM and SJ Pierce (eds). CRC Press.

Chapter 2. Whale shark reproduction, growth, and demography.

Pierce SJ, Pardo SA, Rohner CA, et al.

Chapter 6. Whale shark movements and migrations.

Hearn AR, Green JR, Peñaherrera-Palma CR, et al.

Chapter 7. Population ecology of whale sharks.

Rohner CA, Norman BM, Reynolds S, Araujo G, Holmberg J, and SJ Pierce.

Chapter 8. Whale shark foraging, feeding, and diet.

Rohner CA, and CEM Prebble.

Chapter 11. Global threats to whale sharks.

Rowat D, Womersley F, Norman BM, and SJ Pierce.

Chapter 12. Conservation of whale sharks.

Pierce SJ, Grace MK, and G Araujo.

Chapter 13. Outstanding questions in whale shark research and conservation.

Rowat D, Robinson DP, Dove ADM, et al.

Reef manta ray cephalic lobe movements are modulated during social interactions.

Perryman RJY, Carpenter M, Lie E, Sofronov G, Marshall AD and C Brown. Behavioral Ecology and Sociobiology 75: 51.

Satellite tracking of rehabilitated sea turtles suggests a high rate of short-term survival following release.

Robinson DP, Hyland K, Beukes G, et al. PLoS ONE.



HIGHLIGHTING OUTREACH

OCEAN GIANTS
MAGAZINE

We launched a new high-end quarterly magazine to help showcase marine research, conservation, and education to over **6,000 subscribers.**



LAUNCHED OUR
MEMBERSHIP PROGRAM

We created a portal to share exclusive members-only MMF content, with over **140 Founding Members** signing up in the first weeks.

GREW OUR
SOCIAL MEDIA

29,000+ 21,000+

WATERBEAR
QUEEN OF MANTAS

was released, showcasing MMF founder Dr Andrea Marshall's pioneering manta conservation work.



2021 MEDIA FEATURES

National Geographic Traveller · Forbes · CNN · Condé Nast Traveler · Dive magazine · Associated Press · DiverNet · oceanographic · waterbear



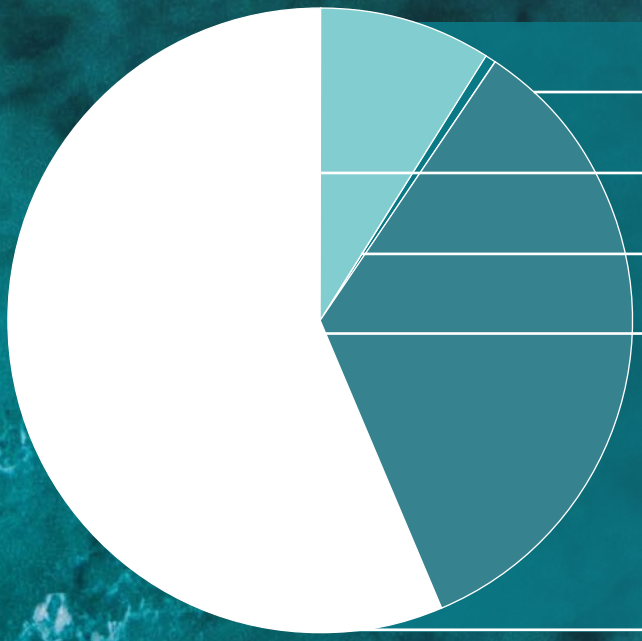
DR STEPHANIE VENABLES CONDUCTING AN ELASMOBRANCH SURVEY IN MOZAMBIQUE.





FINANCIAL SUMMARY 2021

REVENUE



Institutional grants $272,198 | **35%**

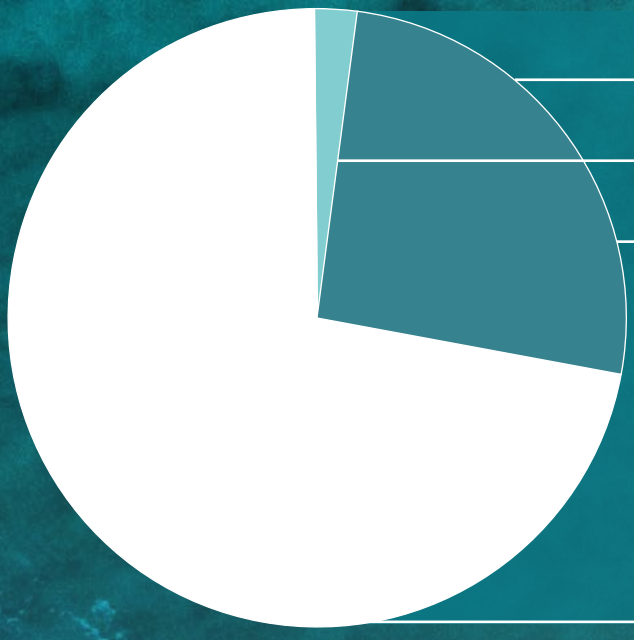
Corporate donations $55,356 | **09%**

Grants from governmental bodies $4,040 | **0.5%**

Private contributions $448,264 | **57.5%**

Total: $779,858

EXPENDITURE



Governance, management and overheads $164,365 | **26%**

Fundraising and communications $12,455 | **2%**

Research, education and conservation activities $449,182 | **72%**

Total: $626,002

SPECIAL THANKS

TO OUR MAJOR PROJECT FUNDERS

> Your help and support enables us to protect the world's most endangered ocean wildlife, train the next generation of conservationists, and conserve marine ecosystems. These discoveries and successes would not be possible without you. Thank you, so much.



DR. SIMON PIERCE



DR. ANDREA MARSHALL

Alan Parker

Angel Protocol

Art Blocks

Aqua-Firma

Blue Action Fund

Blue Corner Dive

Big Fish Diving

Conservation, Food & Health Foundation

David & Carol Myers Foundation

Disney Conservation Fund

DSZ - International Giving Foundation For Mozambique

Fondation Ensemble

Fortuna Foundation

Georgia Aquarium

Help For Mozambique

Izele Small Grant Scheme

Jim Artindale & Ann Rooney

Mantahari Oceancare

Margo Marshall

Mark & Caroline Hackney

Milkywire

Mohamed Bin Zayed Species Conservation Fund

Ocean Wildlife Project

Our Children's Earth Foundation

Peri-Peri Divers

Planeterra

Prince Albert II of Monaco Foundation

ScubaPro

Shark Conservation Fund

Shark Foundation

Sustainable Ocean Alliance

Swiss Friends Of Galapagos

The Barlow Family

The Wondrous Trust

Turing Foundation

Ultralight Control Systems

UNESCO Green Citizens

US Ambassador's Special Self-Help Fund

Waterlust

Windrush Trust

Zoomarine



> If you want to help our oceans, now is the time. Join us in saving Earth's most iconic marine wildlife.

DR. ANDREA MARSHALL

Co-founder, MMF

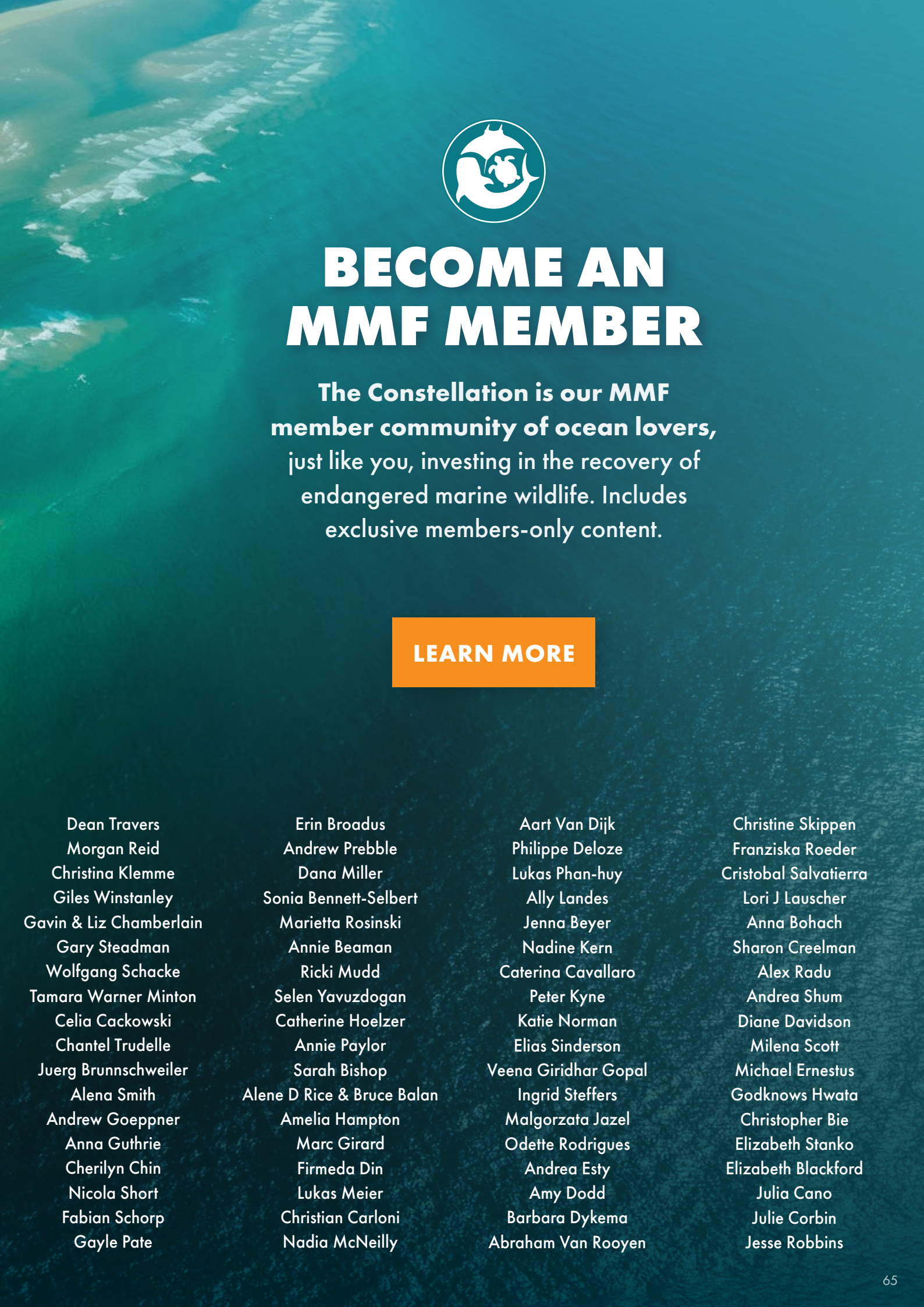
MMF FOUNDING MEMBERS

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Josh Axford
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Laura Weiand
Pam Flam
Mo Flam
Claudia Haas
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Jennifer Folstad



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The Constellation is our MMF member community of ocean lovers, just like you, investing in the recovery of endangered marine wildlife. Includes exclusive members-only content.

LEARN MORE

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Gavin & Liz Chamberlain
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Michael Ernestus
Godknows Hwata
Christopher Bie
Elizabeth Stanko
Elizabeth Blackford
Julia Cano
Julie Corbin
Jesse Robbins





Healthy ecosystems are more resilient to climate change.

We promote marine megafauna species as conservation flagships to preserve and rebuild healthy marine ecosystems.



EXPLORE MMF's PIONEERING MARINE CONSERVATION WORK

Get our FREE Quarterly Magazine delivered straight to your inbox.

LEARN MORE


lore the Marine Megafauna Foundation's pioneering conservation wo
AN GIANTS
SAVING SEA TURTLES 05
MANTAS OF ZAVORA 19
WHALE SHARKS OF GALAPAGOS 31
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ANNUAL REPORT 2021

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