



# Impact Report 2021



A summary of the Manta Trust's charitable research and conservation work in 2021.

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# CONSERVATION

through Research, Education & Conservation

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With COP26 at the end of 2021, the Manta Trust brought a lot of focus to manta rays in a climate crisis.

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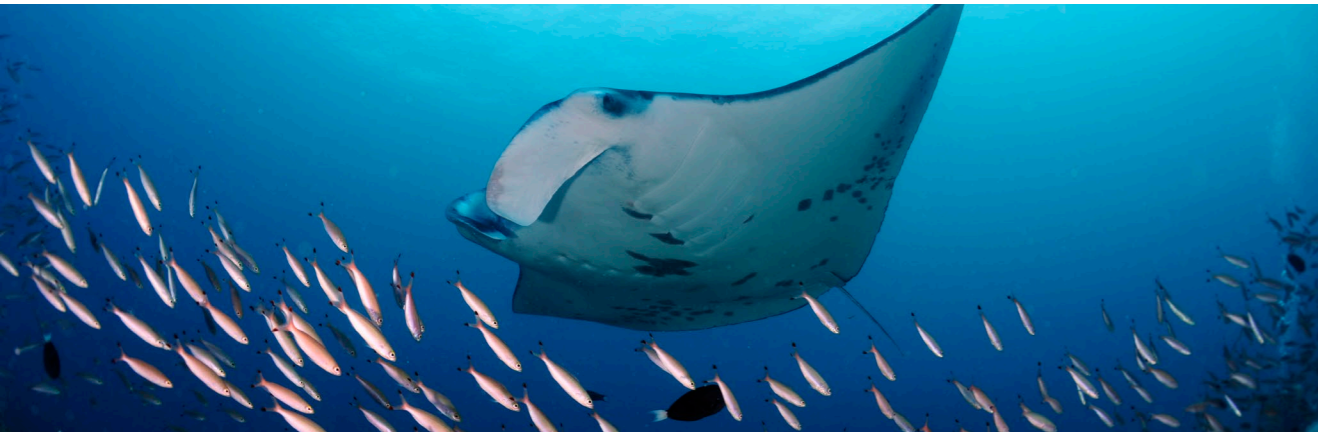
Our education and outreach programme has grown in recent years and we've now launched our online Education Portal.

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#### Studentships

We continued to support the next generation of manta ray researchers and conservationists through our studenthip programmes.



# Introduction & Welcome

**Despite the many challenges which remain, the Manta Trust is more committed than ever.**

Undeterred by the challenges of the continuing pandemic, in 2021 the charity continued to grow and succeed in achieving our strategic goals. This would not be possible without the generosity of our supporters, and the hard work and dedication of the Manta Trust's core operations team and our affiliate partners. For this, and to them, I am immensely grateful.

As I look forward to 2022, I am excited and relieved at the

prospect of a return to more normality in the world. Indeed, most of the core team and our affiliates are busy planning and facilitating field research activities, conference attendances, and education and fundraising events. Despite the many challenges which remain, the Manta Trust is more committed than ever to ensure the conservation of manta rays and the habitats upon which they depend.

Dr. Guy Stevens  
Chief Executive & Co-founder





# DR. GUY STEVENS ”

*When you look into the eye of a manta ray and wonder what it is thinking, you always get the feeling it is looking back at you and pondering the same question.*



# Interview with the Chief Executive

**Dr. Guy Stevens is the Chief Executive and Co-founder of the Manta Trust. He has dedicated the last 17 years of his life to the research and conservation of mobulids.**

How did you get into a career in marine conservation?

**Dr. Guy Stevens:** After graduating in Marine Biology & Coastal Ecology from the University of Plymouth, UK I moved to the Republic of Maldives to work as a marine biologist onboard the Four Seasons Explorer, a luxury liveaboard dive boat. As part of my job I got to see manta rays on a regular basis while leading dive and snorkel excursions.

What captivated you the first time you saw a manta ray?

**Dr. Guy Stevens:** Their grace, their size and inquisitive nature. When you look into the eye of a manta ray and wonder what it is thinking, you always get the feeling it is looking back at you and pondering the same question.

Have you ever been afraid during fieldwork?

**Dr. Guy Stevens:** Yes, but never by any of the animals which live in the ocean, only by the ocean itself. Mother Nature

can creep up and smack you hard in the face sometimes when you least expect it. I love our little research boat, but it's not exactly state of the art. There have been a few memorable occasions when being stuck out in the middle of the ocean during massive storms, with waves breaking over the top of the boat, when I have thought to myself it would have been better to have stayed on the island.

What are your biggest fears for these animals?

**Dr. Guy Stevens:** That by the time I have kids of my own and they are old enough to have their own encounters with these amazing animals, there won't be any left in our oceans.

What is your favourite place in the world?

**Dr. Guy Stevens:** Ha ha.....anywhere there are manta rays. But if I had to pick one place, it has to be Hanifaru Bay in the Maldives. There is nowhere else like it on this planet.



# Manta and Devil Rays

Manta rays are some of the largest and most intelligent animals in the sea. Their complex social behaviours set them apart from many other fish, but much of their lives remain a mystery.

Manta and devil rays, known collectively as mobulids, are some of the most beautiful, fascinating and enigmatic creatures in the oceans.

Closerelatives of all sharks and rays, these cartilaginous filter feeding fishes range throughout the tropical and sub-tropical oceans of the world. Born into a life of perpetual motion, they can never stop moving as they must keep water flowing over their gills to respire. Their daily and seasonal movements are tuned to the ebb and flow of the ocean currents that breathe life into their world, bearing the planktonic food upon which they depend.

Manta rays are giants of their kind, with the largest individuals reaching seven metres in width and weighing up to two tonnes. Despite their colossal presence, mantas are gentle creatures. They have the largest brain of all fish, and their intelligence and curiosity make encounters with manta rays a truly magical experience. It is little wonder that for many years they have been well known and loved by the scuba diving community. More recently, they have also found mainstream popularity with a wider, global audience, featuring in ground-breaking wildlife

documentaries such as the BBC's Blue Planet II. Their obvious intellect and complex social interactions set manta rays apart from other fishes, but as they have only been scientifically studied in detail for around a decade, much of their life history remains a mystery.

Mobulids first appear in fossil records around 28 million years ago; evolving from bottom dwelling rays, they adapted to life in the water column. They are defined by their specially modified gill plates, which they use to strain zooplankton from the water column. Mobulid rays have a conservative life history strategy; they take a long time to reach sexual maturity, are slow to reproduce, and give birth to a single pup every two to five years following a nine to twelve month pregnancy. This strategy may have served them well for millions of years but unfortunately these traits, paired with their highly migratory nature, now leave mobulids extremely vulnerable to overexploitation by humans.



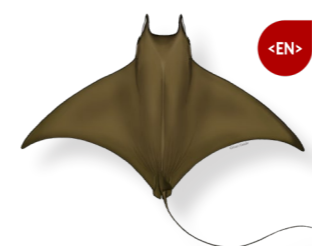
**Oceanic Manta Ray**  
*Mobula birostris*  
IUCN Red List Population Trend  
↓ DECREASING



**Reef Manta Ray**  
*Mobula alfredi*  
IUCN Red List Population Trend  
↓ DECREASING



**Atlantic Manta Ray**  
*Mobula cf. birostris*  
Not currently recognised by the IUCN Red List



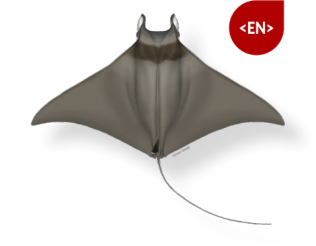
**Sicklefin Devil Ray**  
*Mobula tarapacana*  
IUCN Red List Population Trend  
↓ DECREASING



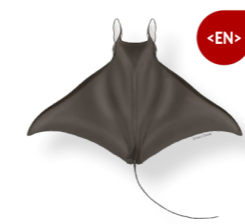
**Spinetail Devil Ray**  
*Mobula mobular*  
IUCN Red List Population Trend  
↓ DECREASING



**Bentfin Devil Ray**  
*Mobula thurstoni*  
IUCN Red List Population Trend  
↓ DECREASING



**Shorthorned Pygmy Devil Ray**  
*Mobula kuhlii*  
IUCN Red List Population Trend  
↓ DECREASING



**Longhorned Pygmy Devil Ray**  
*Mobula eregoodoo*  
IUCN Red List Population Trend  
↓ DECREASING



**Munk's Pygmy Devil Ray**  
*Mobula munkiana*  
IUCN Red List Population Trend  
↓ DECREASING



**West Atlantic Pygmy Devil Ray**  
*Mobula hypostoma*  
IUCN Red List Population Trend  
↓ DECREASING



**East Atlantic Pygmy Devil Ray**  
*Mobula rochebrunei*  
Not currently recognised by the IUCN Red List

Key: Endangered Vulnerable

# The Manta Trust



## Research

By conducting long-term, robust scientific studies, we aim to build the solid foundations upon which governments, NGOs and conservationists can make informed and effective marine management decisions.



## Education

As charismatic megafauna, manta rays act as a flagship species, helping to motivate and engage people with the wider message of marine ecosystem conservation. Through this top down approach, the manta ray becomes the catalyst for change, educating people about the solutions needed to ensure the long-term survival of these animals and the underwater world we rely upon.



## Collaboration

With a network of over 25 projects worldwide, we specialise in collaborating with multiple parties to drive conservation as a collective; from businesses and governments, to individuals and local communities.



**Formed in 2011, the Manta Trust is a UK registered charity that coordinates global mobulid research and conservation efforts.**

### Our Approach

The Manta Trust takes a unique, multifaceted approach to mobulid conservation, which sets us apart from others in the field.

### Stronger Together

Our team is comprised of a diverse group of researchers, scientists, conservationists, educators and media experts; working together to share and promote knowledge and expertise.

### Our Impact

- Instrumental in helping gain protection for Hanifaru Bay and assisting the creation of the site's management plan.
- Contributed critical data and expertise for the status re-assessment of all mobulid species on the IUCN's Red List of Threatened Species.

- 'Concerted Actions' proposal submitted by the Manta Trust to the CMS CoP12 was accepted.
- Launched a multi-media initiative, "How to Swim with Manta Rays", to support and increase sustainable manta tourism.
- Published "MANTA Secret Life of Devil Rays", the world's first ever book on manta rays.
- Collaborative efforts resulted in the listing of both species of manta under Appendix II of the CITES.
- Similarly, efforts resulted in the later listing of devil rays under Appendix II of the CITES.
- Aided in the successful adoption of all mobulid species under the CMS Appendix I & II.
- Helped gain national protection in regions with some of the world's largest mobulid fisheries including the Maldives, Mexico, Indonesia, Peru, and Thailand.
- Created a Global Strategy & Action Plan outlining what actions need to be taken to ensure the long-term survival of mobulid rays.



## Mission

Our mission is to conserve mobulid rays, their relatives, and their habitats, through a combination of research, education and collaboration.



## Vision

Our goal is a sustainable future for the oceans, where manta rays and their relatives thrive in healthy, diverse marine ecosystems.

*"In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we are taught."*

- Baba Dioum

# Our History

The idea was to create a global network of mobulid scientists and other experts in realms as diverse as education, advocacy, policy, and media, who would work together specifically to conserve manta rays and their relatives.

## How it Began

In 2010, after two depressing weeks of counting and photographing dead manta and devil rays at fish markets in Sri Lanka, marine biologist Dr. Guy Stevens, and National Geographic photographer Thomas Peschack had an idea. Over dinner their discussion had turned to the alarming threats facing these rays globally: the gill plate trade that was driving international trade and targeted fisheries, and the devastating impacts of bycatch, climate change and the development of tourism. The idea was to create a global network of mobulid scientists and other experts in realms as diverse as education, advocacy, and media, who would work together specifically to conserve manta rays and their relatives. That night, the friends reached out to a handful

of colleagues – and in doing so laid the foundations for the Manta Trust charity.

Since launching in 2011, The Manta Trust has partnered with over 25 Affiliate Projects worldwide and our flagship research project, the Maldivian Manta Ray Project, has evolved into one of the largest and longest-standing manta conservation groups in the world. Our global network has positioned itself as the leading authority on mobulid rays with several significant achievements to date including; gaining international protective legislation for all mobulid species through CMS Appendix I & II listings, developing the first scientifically advised Best Practice Guidelines for Shark and Ray Tourism (in collaboration

**Manta**  
TRUST

with WWF and Project AWARE), working with the IUCN Shark Specialist group to develop a Global Conservation Strategy for Manta and Devil Rays, publishing the world's first book dedicated to manta biology, 'MANTA: Secret Life of Devil Rays' and the first 'Field Guide to the Manta and Devil Rays of the World', and playing a key role in gaining national protection for manta rays in the Republic of Maldives, Indonesia, Peru and Mexico.

Collaboration is always at the heart of our work. In 2018 we unveiled our Global Strategy & Action Plan for Mobulid Conservation which is helping us to direct global efforts and priorities to conserve manta and devil rays, as well as highlight where the Manta Trust fits into this bigger picture. In 2020 we conceptualised and launched the first ever World Manta Day and have been joined by over 33 organisations over the last two years in celebrating manta and devil rays and raising awareness of the threats they face.

2022

2018

### Global Strategy

*Created a Global Strategy & Action Plan outlining what actions are needed to ensure the long-term survival of mobulid rays.*

2016

### CMS Adoption

*All mobulid species adopted under the Convention on Migratory Species (CMS) Appendix I & II.*

2013

### CITES Adoption

*All manta species listed on Appendix II of the Convention on International Trade in Endangered Species (CITES).*

2011

### Manta Trust Formed

*to drive the research and conservation of mobulids worldwide.*

2005

### MMRP Founded

*The Maldivian Manta Ray Project was founded in 2005 by Dr. Guy Stevens.*

# Threats



## Mobulids in Peril

**In the face of threats, the Manta Trust is working to turn the tide for these species.**

Mobulid rays have historically evaded commercial fishing, but in recent decades a new market has opened, and they are now heavily sought after for their gill plates for use in some Asian Medicine. Gill plates, or branchial filaments, are thin cartilage filaments that enable manta and devil rays to filter zooplankton out of the water column. Retailers claim that just as mobulids use gill plates to filter plankton from the water, they can aid in the detoxification and purification of the consumer by filtering disease and toxins from the body. However, there is no scientific evidence to support these claims. Worse still is that gill plates are not truly a Traditional Medicine - the demand has arisen due to product marketing by retailers, who have falsely 'revived' a remedy that never existed in the traditional literature.

## Major Threats



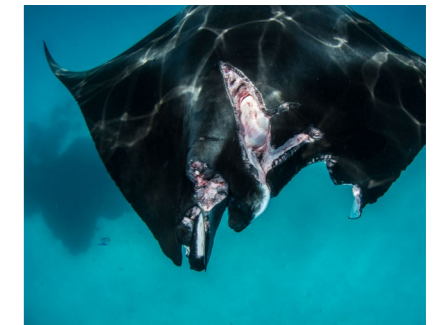
**Targeted Fisheries**

A few countries and regions around the world have actively targeted manta rays for consumption. Although these artisanal fisheries are small in scale, they can still have a significant impact on populations due to mobulid rays' conservative life history.



**Bycatch Fisheries**

Increasingly of concern is the threat posed by incidental bycatch fisheries. Manta and devil rays species often have overlapping habitat ranges with commercially more desirable species, like tuna. Indiscriminate fishing methods like long-lining, gill-netting and purse seine netting capture an alarming number of mobulids annually.



**Unsustainable Tourism**

Overcrowding of manta ray cleaning stations and feeding sites with poor in-water human behaviour will lead to negative impacts on the local populations. Boat strikes and entanglements in mooring lines are a growing threat as tourism around manta aggregation sites increases.



### Gill plate trade

The major financial driver of mobulid fisheries is the international trade in gill plates which sell for a high price.



### Declining populations

Targeted and bycatch fisheries have had a devastating impact on populations of manta and devil rays.



### Conservation status

Of the nine recognised species, seven are listed as endangered and two are vulnerable on the IUCN's Red List of Threatened Species.



# Mantas in a Climate Crisis

Humanity is facing the defining crisis of our time, a climate emergency of our own making.

Each year, billions of tons of CO<sub>2</sub> are released into the atmosphere from human activity, producing greenhouse gas emissions at a record high. No place on earth is safe from the devastating effects of the climate crisis, including the world's oceans, which play a fundamental role in absorbing and redistributing heat and carbon dioxide. Consequently, the polar ice caps are melting, rainforests are burning, coral reefs are dying, and the oceans are acidifying. We must ACT NOW or the impact on humans and all life on earth will be catastrophic.

Despite being a small non-profit marine conservation organisation, we are very aware that we too have a carbon footprint and that it is our responsibility to reduce this as much as possible. In

September 2021, we published the Manta Trust's climate mandate which sets out how we aim to tackle our climate impact and use our position to raise awareness around the subject and encourage businesses and individuals to make change.

We also know that knock-on effects of the climate crisis such as coral bleaching and reduced zooplankton availability are likely to have major impacts of mobulid ray populations and distributions. So, looking forwards we are increasing our research efforts to evidence the links between plankton productivity and coral-abundance on mobulid fitness and population health, to provide critical insights into the impact of climate change on these vulnerable species.

## World Manta Day

Having conceptualised and launched World Manta Day in 2020, we took the opportunity to theme the day around 'Mantas in a Climate Crisis' in 2021 bringing attention to the threats the climate breakdown brings to manta rays and their habitats.

## 40 tonnes of CO<sub>2</sub> offset in 2021


Inline with our new climate mandate, we are offsetting core operations emissions we cannot avoid. In 2021 these were offset against Sidrap Wind Farm in Indonesia.



# 50%

reduction in zooplankton is predicted in tropical regions due to the climate crisis.

Ocean productivity models predict huge declines in zooplankton biomass in tropical waters, which would spell disaster for manta and devil ray populations. When food availability is limited it is likely that manta rays will focus on survival and reproductive activity will become less common.



### Habitat Destruction

Rising sea surface temperatures are causing mass coral bleaching and mortality events. As the building blocks of the entire reef ecosystem, the death of coral reefs is destroying the habitat which reef manta rays depend on for their survival.

### Manta Trust Climate Mandate

As a team, the Manta Trust has reviewed our aims and operations, and set out our climate mandate.

				
<b>Reduce</b> Taking meaningful steps to identify and reduce our core team's carbon footprint.	<b>Offset</b> Offsetting the emissions that we cannot avoid.	<b>Education</b> Expanding educational outreach on climate issues, empowering people to act for the oceans.	<b>Support</b> Adding our voice and support to climate campaigns and policy actions.	<b>Amplify</b> Using our online platforms and public events to talk regularly about the climate crisis.

# Education

"The children absolutely loved learning all about manta rays during our talk. It exposed them to things the majority of them would not normally have the chance to see and explore! They had a fantastic afternoon and are very lucky to have had this opportunity."  
- Rebecca Watson  
Teacher, Bromley, UK



# 1,336

**students**  
from 14 schools across the UK, Maldives and Australia were engaged in virtual and in-person lessons with our team.

## Inspiring Ocean Guardians

Education is one of the three key pillars of our approach because we believe that conservation efforts must tackle the root of the problem, and not just the symptoms. We want to engage and inspire people with the marine environment, educate them about blue issues and their impact on wildlife, and empower them to take action for the oceans. We also believe that conservation can only be truly effective when everyone has a seat at the table. Currently, the conservation sector is predominantly made up of people from privileged backgrounds. Not only is this disparity unethical, but it also hinders success. Our ambition is therefore to greatly expand our outreach by developing a comprehensive education strategy that will benefit people from all backgrounds, all around the world.

In the meantime, we spent 2021 expanding our online educational resources, developing an Education Portal, Ocean Education Booklet and virtual classes that are appropriate and engaging for use by educators globally.

The Manta Trust aimed to reach as many students as possible during the pandemic. Despite not being able to access schools in-person, we developed an engaging series of interactive ocean education classes, with topics ranging from manta ray research to ocean biodiversity and endangered species. This allowed us to engage students in areas that otherwise do not get many opportunities to connect with researchers or to learn interactively about the ocean.




## Ocean Education Lesson Plan Booklets

In September 2021 we launched our 32-page Ocean Education lesson plan booklet for educators to use worldwide. This booklet contains 17 lesson plans, which span 14 school subjects and 11 core curriculum themes, as well as aligning to International Ocean Literacy Principles and Sustainable

Development Goals. The booklet is available to download in three languages from our brand-new Education Portal – an exciting educational hub where teachers and parents can access the lesson plans as well as dozens of engaging activities for younger children.

  
**Education Portal**  
We launched a dedicated education portal with teacher lesson plans, activities and kids club games.

  
**Virtual Classes**  
Teachers can now book virtual classes with leading scientists and conservationists from the Manta Trust.

  
**Booklet Distribution**  
By distributing the Ocean Education lesson plan booklets in three languages through our affiliate project network we hope to reach 20,000 students in the first year.

  
**Ocean School**  
Continued to build relationships with three schools in the Maldives ready to relaunch our marine education programme when Covid-restrictions allow.

# Far North Maldives Research Expedition



## The biggest gathering of manta researchers and educators in Manta Trust's history.

This expedition was a unique opportunity for the Manta Trust to visit schools where we have previously had little or no opportunities to conduct environmental education lessons, or swim and snorkelling lessons. These remote islands, which are often fishing communities, are heavily reliant on their increasingly threatened oceans. Ensuring that citizens are knowledgeable about environmental threats, and the value of marine conservation, is key for island communities such as these to develop sustainably.

Our Education Team on the trip comprised members of staff from the Maldives National University, the Maldives Environmental Protection Agency, the dive industry, and the Manta Trust. Running education and careers sessions with Maldivians from a range of environmental careers proved to be empowering for the students we met.



## Unparalleled Opportunity

Generous funding from our partner Carl F. Bucherer gave us the unprecedented opportunity in 2021 to hire a vessel in the Maldives and use it as a floating research station for 18 days. Equipped with a team of manta scientists and educators, this vessel set out on an expedition at the end of October to the far northern atolls of the Maldives. We travelled into undocumented manta habitat, helping us to identify new manta ray aggregation sites, and connect with local communities which are normally out of our reach. By having a large skill-varied team of Manta Trust experts on board we were able to carry out not only a wide variety of research aims (from population ecology to habitat use and migration behaviour), but also to carry out educational outreach on new islands and gather historical knowledge from local fishers.

## Expedition Deliverables

Beyond the research outputs mentioned below, the expedition provided a rare chance for our disparate team to spend several weeks together in person. This precious opportunity for friends and colleagues to share ideas and learn from each other has led to several new plans for collaboration and the conceptualisation of new conservation strategies for the Manta Trust's global network.



### Surveying

During this 18 day expedition we visited five atolls in the far north of the Maldives and conducted 53 hours of in-water survey and scientific dives and snorkels.



### Reproductive Ecology

The team obtained 428 repeated disc-width measurements of 30 different manta rays. The team also managed to obtain 46 ultrasound examinations of 23 different manta rays, almost doubling the current amount of ultrasound data collected in the Maldives. This data will help better understand and document the process of sexual maturation and detect early signs of pregnancies in reef manta rays in the Maldives, establish growth rates, the size at which manta rays reach sexual maturity, and if individual manta rays visit different sites based on their size and age. Our understanding of these aspects of manta rays' biology could have important implications for their conservation.



### Photo-ID

We identified 231 reef manta rays, of which 28 were new to our database. The number of new manta rays sighted was lower than we had expected, which tells us that we now have good photo-ID capture of the reef manta population throughout the country.



### Outreach

We ran six sessions with five schools and one orphanage, teaching up to 80 students and 30 parents in each school, and reaching a total of 335 people. Each session included a manta ray research presentation, Virtual Reality manta rays and whale sharks experience, and a careers session where students learnt about environmental study routes and careers from the education team.



# Events



## Manta Trust at COP26

Glasgow, United Kingdom

**We used our stall to amplify small islanders' voices, emotions and hopes for the future.**

We were proud to be one of the few organisations selected to host an exhibition stall at the United Nations Climate Change Conference (COP26) Green Zone in November 2021. We utilised our space to raise the voices of those often overlooked in climate discussions: young people, especially those from some of the countries most affected by climate breakdown.

Sharing personal stories and promoting emotional connections with people or places are some of the most effective ways to encourage pro-environmental behaviour change. We used our stall to bring together our global network of collaborators to amplify small islanders' voices, emotions and hopes for the future and open a dialogue between attendees and participants.

## Other Events



### Mitsukoshi Word Watch Fair

Tokyo, Japan

Carl F. Bucherer, a principal supporter of the Manta Trust, invited us to talk about manta rays and our conservation work at the Mitsukoshi Word Watch Fair in Tokyo, Japan. Our virtual talk was very well received by attendees and it was great to share our knowledge with new audiences.



### Beyond and Below

London, United Kingdom

Half a dozen of the charity's core operations team attended the Beyond and Below event held by Explorers Against Extinction at the Royal Geographical Society in London. The Manta Trust's Director of Operations Bex Carter gave a presentation on the main stage on the Manta Trust's work.



### Cross the Oceans

Global

In light of athletic fundraising events continuing to be cancelled due to COVID-19 in 2021, the Manta Trust launched a virtual fundraising event of our own. Supporters ran, swam, cycled and kayaked a personal challenge over the month of June to raise funds for the Manta Trust.



### Island Nations Video

Created a video in which indigenous people from small ocean states were interviewed about how climate change affects them.



### Poems & Art

Students from around the world submitted poetry and art work on the topic 'Climate Crisis and Me', with the winning pieces showcased.



### Virtual Reality

Using virtual reality, we took visitors to COP26 on a virtual dive with manta and devil rays.

# Peer-Reviewed Publications

The Manta Trust core team and affiliate project network has continued to work hard turning years of data collection into peer-reviewed publications which advance science and conservation.


## Papers to Highlight



### Devils in Distress

The Sri Lankan small-scale artisanal fleets capture more manta and devil rays than the estimated annual global capture of all industrial purse seine fisheries combined! The scale of these fisheries, combined with decreasing catches, high proportions of immature and juvenile individuals, decreases in body sizes over time, and the total mortality of the most common species exceeding its population growth rate suggests that the Sri Lankan manta and devil ray fishery is extremely unsustainable.

The authors recommend that Sri Lanka implement regulations to fully protect manta and devil rays, in compliance with their obligations as a Party to the Convention on Migratory Species and with the Indian Ocean Tuna Commission. Proactive fisheries management (catch limits, time/area closures etc.) for all sharks and rays are also recommended to ensure sustainable fisheries and avoid situations where species require more drastic interventions.

 Fernando, D., and Stewart, J.D., 2021. High bycatch rates of manta and devil rays in the "small-scale" artisanal fisheries of Sri Lanka. PeerJ.


## List of peer reviewed publications from 2021

The Manta Trust is committed to breaking down barriers in science communication. One such barrier is the cost of accessing publications. The Manta Trust is committed to making all papers open access where the lead author's primary affiliation is to our charity. This costs between 3-5,000 USD per paper.

	Publication title	Journal	Authors
1.	Description of first nursery area for a pygmy devil ray species ( <i>Mobula munkiana</i> ) in the Gulf of California, Mexico.	Nature	Marta D. Palacios, Edgar M. Hoyos-Padilla, Abel Trejo-Ramírez, Donald A. Croll, Felipe Galván-Magaña, Kelly M. Zilliacus, John B. O'Sullivan, James T. Ketchum & Rogelio González-Armas
2.	Motivations for compliance in Peruvian manta ray fisheries.	Marine Policy	Lucie Guirkinger, Stefany Rojas-Perea, Isabel Ender, Mark Ramsden, Charley Lenton-Lyons, Jonas Geldmann
3.	Fine-scale oceanographic drivers of reef manta ray ( <i>Mobula alfredi</i> ) visitation patterns at a feeding aggregation site.	Ecology and Evolution	Joanna L. Harris, Phil Hosegood, Edward Robinson, Clare B. Embling, Simon Hilbourne, Guy M. W. Stevens
4.	Quantifying the effects of diver interactions on manta ray behavior at their aggregation sites.	Frontiers in Marine Science	Miguel de Jesús Gómez-García, María del Carmen Blázquez-Moreno, Joshua David Stewart, Vianey Leos-Barajas, Iliana Araceli Fonseca-Ponce, Aldo Alfonso Zavala-Jiménez, Karen Fuentes and James T. Ketchum
5.	Environmental drivers of reef manta ray ( <i>Mobula alfredi</i> ) visitation patterns to key aggregation habitats in the Maldives.	PLOS ONE	Joanna L. Harris, Guy M. W. Stevens
6.	A hitchhiker guide to manta rays: Patterns of association between <i>Mobula alfredi</i> , <i>M. birostris</i> , their symbionts, and other fishes in the Maldives.	PLOS ONE	Aimee E. Nicholson-Jack, Joanna L. Harris, Kirsty Ballard, Katy M. E. Turner, Guy M. W. Stevens
7.	Reef manta rays forage on tidally driven, high density zooplankton patches in Hanifaru Bay, Maldives.	Peer J	Asia O. Armstrong, Guy M.W. Stevens, Kathy A. Townsend, Annie Murray, Michael B. Bennett, Amelia J. Armstrong, Julian Uribe-Palomino, Phil Hosegood, Christine L. Dudgeon, Anthony J. Richardson
8.	High bycatch rates of manta and devil rays in the "small-scale" artisanal fisheries of Sri Lanka.	Peer J	Daniel Fernando, Josh Stewart

### Devil Ray Nursery

Very little is known about nursery areas for mobulid species. This study identified a bay in the Gulf of California which is comprised predominantly of neotate and juvenile Munk's Pygmy Devil Rays (*Mobula munkiana*). Their residency index was significantly higher than outside the bay, and observations of near-term pregnant females and mating behaviour further signify the importance of the bay. Data from this study will help design of spatial and temporal management strategies to mitigate bycatch in artisanal fishing and to regulate ecotourism activities.

 Palacios, M.D., Hoyos-Padilla, E.M., Trejo-Ramírez, A. et al., 2021. Description of first nursery area for a pygmy devil ray species (*Mobula munkiana*) in the Gulf of California, Mexico. Nature Sci Rep 11, 132



8

### Published Papers

Manta Trust core staff and affiliate project researchers were lead or co-authors on 8 peer-reviewed publications this year.

>300

### Downloads

Each paper was download over 300 times on average. The number of citations will be a true indication of impact but this will not be known for a while.

# Studentships

Over the years, the Manta Trust has supported a number of students pursuing a research career in mobulid ecology, fisheries, and conservation. The support provided by the charity has come in the form of financial support, access to, and support in field locations, as well as mentoring and academic support.



## 2021 External Supervision

**7** PhD students

We have provided continual support and supervision for a number of doctoral candidates.

**2** MSc students

Through long-term collaborations with Universities, we have supported a number of masters thesis projects.

**4** BSc students

Our studentship support extends to the earliest levels of higher education.

## Ocean Giants Programme



### Collaboration

Over 2021 we continued our collaboration with The University of Plymouth School of Biological and Marine Sciences, working to prepare the next generation of marine researchers and conservationists for the challenges ahead, and in the process provide assistance to four fantastic marine research and conservation NGO partners: The Manta Caribbean Project, Sea Sense, LAMAVE and Sea Search.

### The Programme

A two-year Programme, designed to equip participating students with useful skills and experience in several aspects of the real workings of a marine charity. Apprentices spend their first year building a relationship with their Partner NGO remotely, whilst undertaking OGP training, before visiting their Partner to carry out an in-situ placement during their second year.

## Current students of 2021

There are currently a number of research students around the world pursuing a doctorate, masters or bachelor of science or conservation through the Manta Trust.

Student	Project Title	University
<b>PhDs</b>		
1. Niv Froman	The reproductive ecology of the manta ray: life history factors limiting population growth.	University of Cambridge, UK
2. Hugo Lassauce	Characteristics and spatial ecology of the Reef Manta Ray ( <i>Mobula alfredi</i> ) population of New Caledonia.	University of New Caledonia
3. Joanna Harris	Investigating the movement and foraging ecology of reef manta rays ( <i>Mobula alfredi</i> ) in the British Indian Ocean Territory (BIOT).	University of Plymouth
4. Ana Sobral	Filling the gap: study of the ecology of data-poor pelagic elasmobranchs in oceanic islands in the Atlantic.	University of the Azores
5. Betty Laglbauer	Mobulid ray feeding ecology and sensory biology.	University of the Azores
6. Daniel Fernando	Characterization of Sri Lanka's mobulid ray fisheries.	Linnaeus University
7. Asia Haines	The spatial ecology of manta rays: movement, habitat use and connectivity.	University of Queensland
<b>MSc</b>		
1. Emma Hedley	Ontogenetic variation in patterns of sightings of reef manta rays in the Maldives: environmental influences, distribution, and implications for protected area management	University of St. Andrews
2. Abigail Sehmi	It Takes A Village To Understand A Manta Ray: The contribution of multiple data sources to manta ray research and conservation in the Maldives.	University of Plymouth
<b>BSc</b>		
1. Darcy Brady	Tidal Influences of reef manta ray visitation patterns to a remote cleaning station.	University of Plymouth
2. Lena Pollett	Social network analysis of acoustic tag detections from a remote cleaning station in the Chagos Archipelago.	University of Plymouth
3. Genevieve Alexander	Stable isotope analysis of reef manta ray tissue samples and plankton to identify feeding locations in the Chagos Archipelago.	University of Plymouth
4. Kathryn Thibaut	Intra-annual variations of reef manta ray visitation patterns to a remote cleaning station and the implications for conservation.	University of Plymouth

# In the Media



## Online Articles

The work of the Manta Trust and our affiliate projects has been featured in online articles published in Mongabay, Hakai Magazine, Scuba Diver Mag, GQ UK, Asian Journeys, DIVE Magazine, Diver Net and The Pride Singapore.



## On Television

The Manta Trust has a long history of working with production companies documenting manta and devil rays. In 2021, two productions on which the Manta Trust assisted, aired on TV. Additionally, we helped film two further productions which will air in 2022.



## Our Own Media

We have shared research and conservation stories around mobulid rays throughout the year through impactful imagery, insightful infographics, and powerful videos created by our media team.



*People will only care and protect something if they have a level of connection to it. One way to achieve this is through powerful media.*

### The Mating Game

The Mating Game: Out of the Blue episode narrated by Sir David Attenborough aired in 2021 and featured the courtship and mating ritual of reef manta rays. The Manta Trust team were enlisted by Sliverback Films Ltd. to help document this spectacle.

### Reconnect Maldives

The day to day research and conservation work of the Maldivian Manta Ray Project, including surveying for reef manta rays, collecting photo-IDs and recording oceanographic and tourism data on sightings was covered by CNN Reconnect Maldives who joined our team based at the Four Seasons Landaa Giraavaru.



### Social Media Following

Our social media following, with whom we share research and conservation news, grew to over 112,000 followers.



### The Cyclone

We continued to share exclusive articles and video content with our passionate supporters through 'The Cyclone' platform.



### Media Campaigns

Supported marine education and awareness campaigns like 'Stop Funding Overfishing', and 'Fish Free February'.





# Affiliate Projects



## Our affiliate project network operates in 25 regions.

The Manta Trust brings together new and established projects from around the world, that drive the research and conservation of mobulid rays as a collective.

The nine (or eleven if we include the Atlantic Manta Ray and East Atlantic Pygmy Devil Ray) mobulid species occur throughout the tropical and subtropical oceans of the World. As a result, the Manta Trust has amassed a global network across all of the major regions that manta rays are found.



The affiliate projects in the Manta Trust network focus on a variety of different research, education and conservation objectives. Some, like the Peru Mobulid Project, focus their efforts on fisheries landing sites and working with fishermen to minimise the bycatch of mobulid rays. Other projects, like the

Maldivian Manta Ray Project, have a heavy emphasis on community education and outreach, working a lot with local schools. Others, like Manta Project Fiji, have been deploying state of the art satellite tags on manta rays to learn more movements and habitat use.

### Mobula Conservation

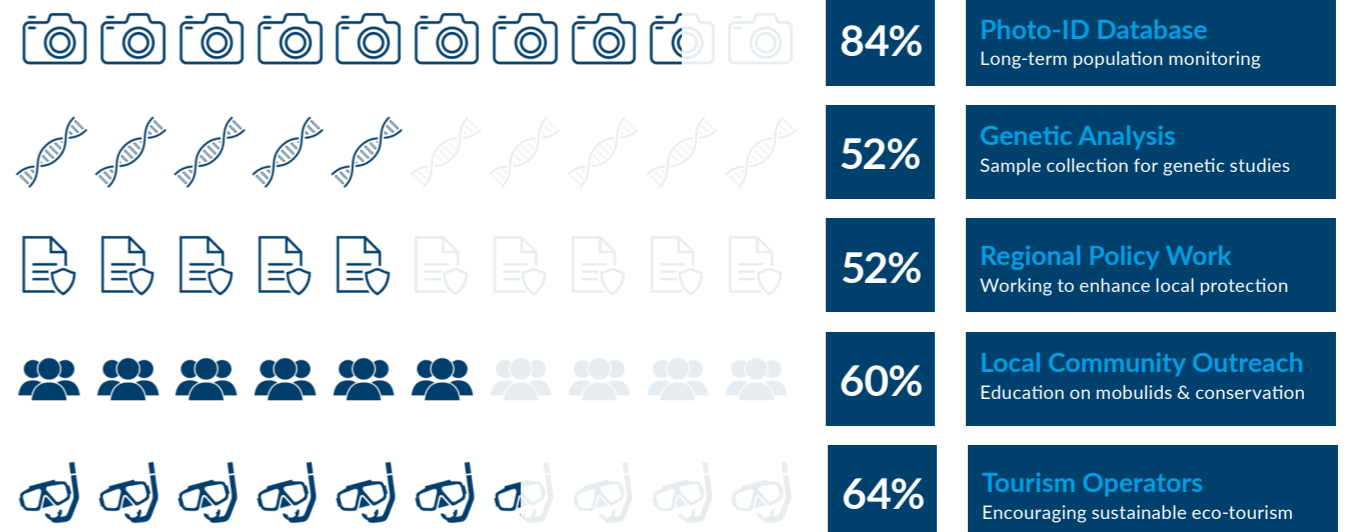
In 2021, Mobula Conservation became an affiliate project of the Manta Trust. The team based on the Pacific coast of North America investigates immediate threats to mobula rays, focusing on habitat use, spatial ecology, oceanographic preferences, and population genetic structure of manta and devil rays. They work with fishermen, skippers, and observers to support the design and implementation of bycatch reduction techniques in small- and large-scale fisheries as well as empower local communities to protect mobulid rays through diver Codes of Conducts and sustainable ecotourism citizen science programmes.



### The Caribbean Islands Manta Conservation Program

The Caribbean Islands Manta Conservation Program is working to understand the biology and ecology of mobulid species across the 700 islands that make up the Caribbean. They are working to better understand the biology and ecology of mobulids throughout the islands of the Caribbean Sea as a means to drive effective conservation measures for these endangered species and the habitats they utilize. This project is the latest to join the Manta Trust's ever growing network.

#### Affiliate project focus species, regions and methods



# Maldivian Manta Ray Project



## >14,500

### Photo-IDs of Manta Rays in 2021

Photo-ID sightings inform us about population size, demographics (how many males/females or adults/juveniles there are), as well as movements and migrations, wound healing rates, associated fauna, and even reproductive ecology. Over the years we have collected over 80,000 photo-ID sightings of nearly 5,200 different reef manta rays (*Mobula alfredi*).



Conservation

### Laamu Marine Protected Areas

At the end of 2021, six ecologically significant sites in Laamu Atoll in the Maldives were being designated as marine protected areas. One of these sites, L. Maabaidhoo Koaru Area encompasses an important manta ray cleaning station. The MMRP team recorded 165 encounters at this site with a maximum of 11 individuals using the cleaning station at once!

This conservation win was a collaborative effort between Six Senses Laamu Maldives Underwater Initiative, Blue Marine Foundation, Olive Ridley Project and the Manta Trust.



Project Bases: Raa, Baa, Lhaviyani, Laamu and Fuvahmulah Atolls.

Bases  
**5**

Staff/Interns  
**20**

Surveys  
**>4,700**

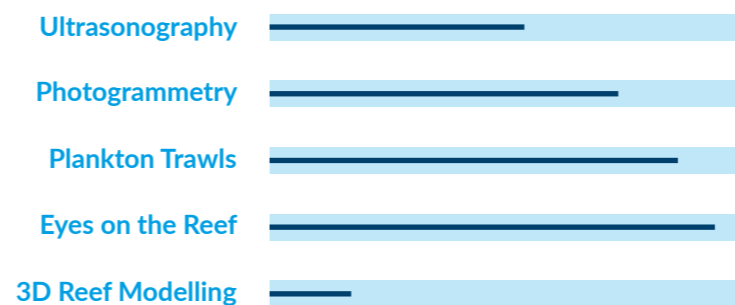
## Maldives

### Founding Project of the Manta Trust.

Formed in 2005, the Maldivian Manta Ray Project (MMRP) is the founding project of the Manta Trust. The MMRP collects data around the country's manta population, its movements, and how the environment and tourism / human interactions affect them. The long-term and nationwide data collected has allowed us to record and identify key patterns within this population over time, informing their on-going management and protection. Research driven by the MMRP has been directly responsible for protecting manta rays and their most critical habitats within the Maldives, but has also played a significant role in gaining protection for populations in other corners of our ocean.

### Continuing Research Activities

On top of the long-term population monitoring photo-ID work our team conducts, we are also undertaking a variety of other research activities. These include, but are not limited to, reproductive ecology studies using in-water ultrasound scans and stereo-video photogrammetry measurements, prey availability and abundance studies, and long-term cleaning station monitoring using timelapse photography and 3D modelling of cleaning stations.



## 34%

### sightings from citizen scientists

We are always very thankful for the submission of manta ray photo-IDs from dive staff and the general public around the country.



## 69

### new oceanic manta rays identified

The oceanic manta ray (*Mobula birostris*) research project also collected microbiome swabs and stereo-video measurements from a dozen individuals around Fuvahmulah Atoll.

# Financial Report

Funding for conservation projects around the world has been under strain during the global pandemic.



The knock-on effects of the Covid-19 pandemic have continued to set back many of our initiatives and fundraising efforts in 2020 and 2021 and we anticipate that the repercussions will continue to hamper conservation efforts for years to come. Thankfully, we are pleased to report that some of our resort and tourism partners have returned to business as travel restrictions have eased, allowing many of our team to return to their work in the field. None of our partner resorts are back to pre-pandemic numbers, and some are still unable to support the Manta Trust as they had previously. We have still been restricted in our ability to travel and meet potential funders and many of our dedicated supporters are still unable to donate as much or as often as they have done previously. Thus, we are very grateful to all the grant giving bodies, sponsors, and donors who continue to provide a lifeline for the Manta Trust and vicariously for our global network of research and conservation projects.



## Income

£608,598

Our fundraising team's strategy aims not just to grow but also diversify our income streams to give us more financial security. It was this risk-averse approach that helped us to weather not only the covid storm (despite losing some sources of income) but also to support several of our affiliate projects too. Again, we would like to thank everyone who donated to us in 2021, however big or small your contribution, for keeping vital mobulid conservation efforts alive. Again, we would like to thank everyone who donated to us in 2021. However big or small, your contribution has kept vital mobulid conservation efforts alive.

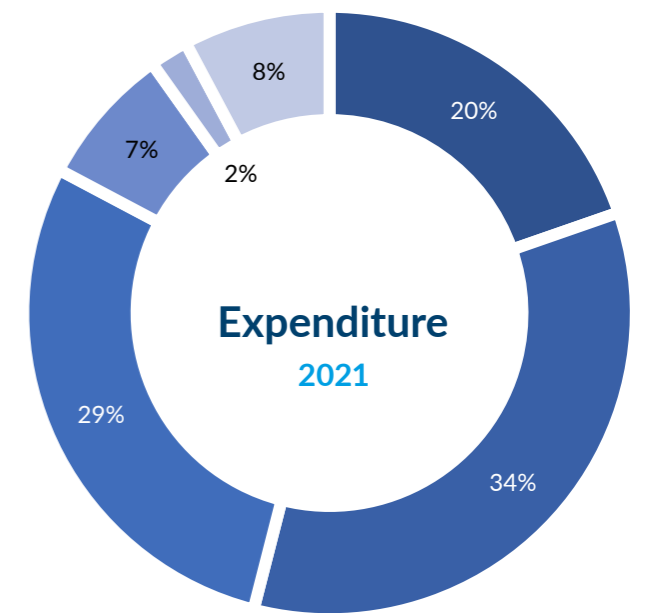
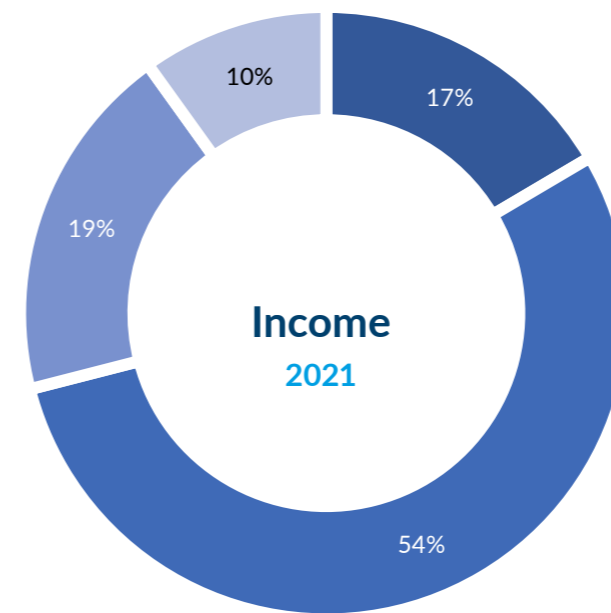
## Expenditure

£481,972

Where our funding is spent is decided by the Core Operations Team, with guidance from our Board of Trustees, and direction from our Global Strategy and Action Plan for Mobulid Conservation.

## Financial Breakdown

Please note that the following figures are unaudited and approximate. For detailed financial information please view our audited [Financial Statement for 2020-21](#). Manta Trust Reserves: To safeguard the core activities of the charity in periods of fluctuating income, the Trustees have established unrestricted reserves to cover six to twelve months operational costs £140,000 to £200,000. In 2021 there were adequate funds to ensure the charity was able to meet all current operational costs and some estimated possible future liabilities. Our unrestricted funds on 30 June 2021 were £399,479.



- Partnership with Maldives Resorts
- Trusts & Research Grants
- Public Donations & Fundraising
- Corporate Social Responsibility Funding

- Maldivian Manta Ray Project (4 bases, 9 staff)
- Operations & Overheads (7 staff)\*
- Research and Conservation Projects
- Education & Outreach Programme
- Studentship Programme
- Research Expeditions

\*Our staff are one the greatest conservation tools at our disposal. Our core team is only small, but its influence is far reaching; as an umbrella organisation, we not only support our own Maldivian Manta Ray Project, but also coordinate activities for, provide expert guidance to, fundraise for, and encourage collaboration between 25 affiliated projects worldwide. Charities are often criticised for spending funds on their operations and overheads; making it difficult for charities to maintain a highly skilled core operational team and pay them a fair wage ([We highly recommend watching this short but powerful TED Talk on the topic](#)). So, we are especially grateful for the incredible support our core team has received from several progressive sponsors and donors over the years, without whom we could not continue our work.

# Thank You & Summary

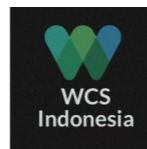
The success and achievements of the Manta Trust in 2021 would not have been possible without the incredible support of the following groups:



PAUL M. ANGELL  
FAMILY FOUNDATION



Ernest Kleinwort Charitable Trust



Loke-Hassell Family

Danny Chau and Mark McCracken + Wonderpup Finn

Radtke Family

J&K Berman Memorial Foundation

Boyland Family

Daniel Roozen



A special mention must go to our Patrons who have been extremely supportive over 2021, helping us to highlight our special events and using their unique platform to raise awareness of the Manta Trust. Thank you to our Trustees for guiding and supporting the core operational team as we strive to grow and develop our charity, and to the Action for Mantas (our partner registered 501 (c)(3) Board for their continued support of us and our US-based supporters. Thanks to Manta Expeditions for helping us to get our researchers into

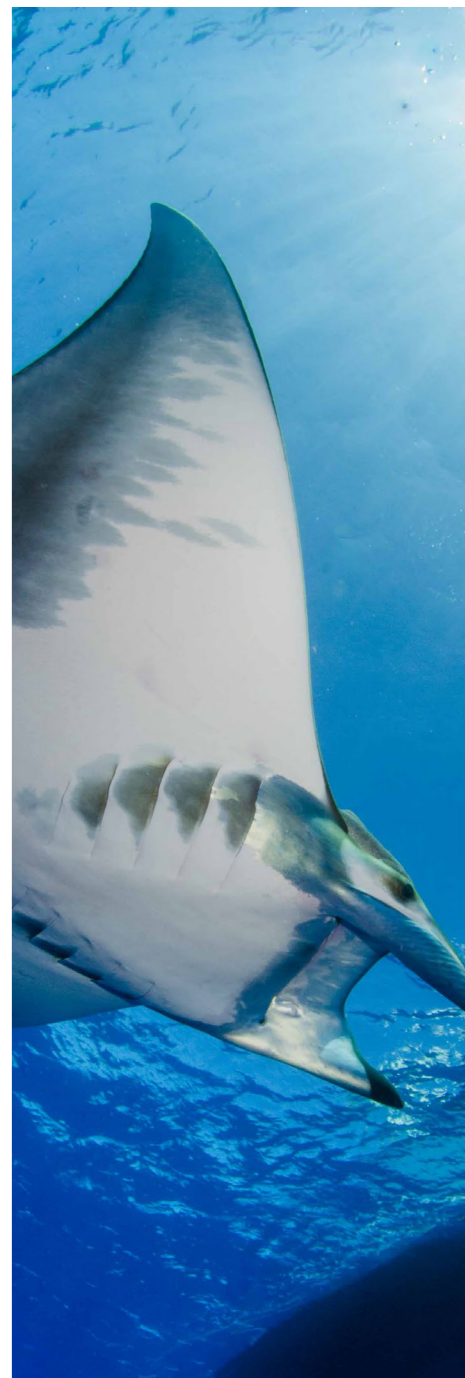
the field and raising much needed donations for our charity. We would also like to extend a huge thank you to our cyclone members, commercial supporters, supporters who adopted a manta ray, purchased our merchandise, donated to us directly, or through Action for Mantas, supported our crowdfunding campaigns, or took part in our Cross the Oceans challenge! Without your support, none of this work would have been possible.



Despite many conservation victories for manta and devil rays to date, these animals remain extremely vulnerable.

Every year our global network of research and conservation projects grows and becomes more interlinked through collaboration and the sharing of expertise. Our global team are more dedicated to their work and to supporting each other than ever before, and as travel becomes easier, many are finally getting back into the field to continue their research. Despite many conservation victories for manta and devil rays, we still have a lot of work to do because to date, these animals remain extremely vulnerable to exploitation, and the threats from targeted fisheries, bycatch, irresponsible tourism, pollution, and the climate crisis persist to stack up against them. Populations continue to decline and their assessed levels on the IUCN's Red List of Threatened Species continue to move in the wrong direction as we uncover more about these species; all are now listed as "Vulnerable" or "Endangered". Over 2022, we will continue to implement our 'Global Strategy and Action Plan for Mobulids' and develop a new Education Strategy to empower underrepresented groups in the conservation sector. Any support you can give, big or small, will make a difference for these incredible animals.

Bex Carter  
Director of Operations





## Impact Report 2021

### Image credits:

Guy Stevens: Front cover, 3, 4, 5, 12, 30, 32, 34, 38  
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### The Manta Trust

The Manta Trust is a registered charity in England & Wales (Charity Number 1145387).

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