

SAVE OUR SEAS FOUNDATION

ANNUAL REPORT 2022



save our seas
foundation



SAVE OUR SEAS FOUNDATION

ANNUAL REPORT 2022





**“AS LONG AS THERE ARE
PEOPLE WHO CARE AND TAKE
ACTION, WE CAN AND WILL
MAKE A DIFFERENCE.”**

THE FOUNDER | SAVE OUR SEAS FOUNDATION



Sharks and rays won hearts and minds in 2022; historic policy listings on CITES, new ventures in film, art and literature, and a record number of project grants make the future a little brighter for species like the lemon shark.

CONTENTS

02	FOUNDER'S STATEMENT
06	CEO'S FOREWORD
12	19 YEARS OF THE SAVE OUR SEAS FOUNDATION
14	WHERE WE WORK IN 2022
16	OUR CENTRES
18	SOSF D'Arros Research Centre
26	SOSF Shark Education Centre
34	SOSF Shark Research Center
42	OUR PARTNERS
44	Bimini Biological Field Station Foundation
52	The Manta Trust
60	Shark Spotters
68	The North Coast Cetacean Society
76	The Acoustic Tracking Array Platform
84	OUR 2022 PROJECT LEADERS
86	Small grant projects
98	Keystone projects Continuation
110	Keystone projects New
114	OCEAN STORYTELLING GRANTS 2022
118	SPONSORSHIPS 2022
126	OUR TEAM
140	FUNDING SUMMARY
144	Credits



Blue sharks pivot in pelagic waters off Cape Town, South Africa, oblivious to history in the making. The blue shark was among 56 requiem shark species listed on CITES Appendix II in 2022, bringing 90% of the shark-fin trade under regulation.

CEO'S FOREWORD

With most restrictions of the pandemic easing, 2022 has been a year of tremendous momentum for the foundation and shark conservation.

Our focus remains firmly on promoting the recovery of overexploited shark and ray populations by supporting research and education initiatives around the world. This year we have provided support for another 60 projects; since starting in 2003, we have now funded 425 projects in 85 countries.

Focusing on projects with the greatest conservation need, finding innovative solutions and supporting early-career researchers still constitute our core funding strategy. Our 2022 portfolio covered species from ghost sharks to great whites, countries from Chile to Indonesia, and subjects from genetics to fossils, making it our most exciting array of projects yet.

We continue to support our three centres in Seychelles, South Africa and the USA. The D'Arros Research Centre, our field station in Seychelles, celebrated this year its 10th anniversary of being managed by the SOSF. This was an important milestone for the centre, which has grown substantially over the past decade. We have a core team of four on site and now regularly host students from the University of Seychelles as well as the revitalised 'D'Arros Experience', where young students from across Seychelles join educational research camps at the centre. Over the past decade, the centre has conducted 30 targeted research projects and maintained 12 long-term monitoring programmes. These provide a deeper understanding of the local ecosystem to help us better conserve its functionality.



Opposite: More effort is going into identifying and protecting important habitats for sharks and rays. Mangroves provide pupping and nursery grounds for many species, including the lemon shark.

Right, above: The rays, skates and chimaeras (like this elephantfish), which make up most of chondrichthyan (cartilaginous fish) diversity and tend to be highly threatened and under-studied, were a prominent feature of projects funded in 2022.

Right, below: Students peer eagerly into the micro dramas playing out in the rock pools of Dalebrook beach, opposite the Save Our Seas Foundation Shark Education Centre (SOSF-SEC) in Cape Town, South Africa. The SOSF-SEC hosted a record number of learners and visitors in 2022.



Our Shark Education Centre in Cape Town strives to foster meaningful connections between people and the ocean through experiential learning. This year marked a new milestone for it: it reached more than 8,000 learners in 2022 alone.

In the USA, our Shark Research Center concentrates primarily on conservation genetics, which this year has focused on decoding the genomes of mako and great hammerhead sharks. This can provide valuable insight into these species' population diversity and conservation needs. Shark Research Center staff also study the migration patterns of certain sharks; in 2022 they identified unprecedented long-distance movements of silky sharks in the Pacific, highlighting the need for management beyond the current network of marine protected areas.

We are increasingly realising the importance of storytelling to connect with audiences and communicate the conservation needs of sharks and rays. 2022 saw an 85% increase from the previous year in editorial mentions for the SOSF, with 700 references. And World of Sharks, our general interest section of the SOSF website, saw a 55% increase in traffic from 2021. Generating this kind of quality content requires an emerging generation of conservation creatives, and our Ocean Storytelling Grants, which foster a new cohort of communicators, grew in 2022. We announced the talented winners of our photography category, who receive a mentored assignment to cover a conservation issue, and launched our new writing category for emerging conservation journalists. We also partnered with Wildscreen, an international natural history film festival that has its roots in conservation storytelling. The festival provided a new and exciting platform for the foundation to engage with a broader audience.

We proudly supported the Sharks International conference in Valencia, Spain, the world's largest gathering of shark and ray conservationists, which takes place once every four years. It represented a welcome return to international in-person meetings and allowed delegates to share critical knowledge and expertise to help move the field of shark conservation forward.



Left: Dillys Pouponeau, research assistant at the D'Arros Research Centre (SOSF-DRC), delivers a talk at Sharks International in Valencia, Spain. The conference facilitated much-needed catch-ups, brainstorming and planning.

Right: The D'Arros Experience immerses keen learners plucked from across Seychelles in a near-pristine wilderness. A dose of wonder, with a good measure of guidance, is a recipe for future blue champions to lead this island nation.

The year culminated in one of the most significant recent achievements in shark conservation, which signals great positive momentum towards a sustainable future for sharks and rays. This was the listing of all requiem shark species and their lookalikes, including the heavily overexploited blue shark, on Appendix II of CITES. CITES regulates the international trade of its listed species and this landmark achievement means that more than 90% of the shark-fin trade now falls under its regulations. We were honoured to play a small role in this achievement by creating the communication materials for the campaign and supporting it through our membership of the Shark Conservation Fund.

We now look forward to building on this progress in 2023, which marks our 20th anniversary year, and aim to consolidate our commitment to shark conservation even further with increased grant capacity and new opportunities for researchers.

Dr James Lea
Chief Executive Officer



19 YEARS OF THE SAVE OUR SEAS FOUNDATION

SINCE ITS INCEPTION IN 2003, THE SAVE OUR SEAS FOUNDATION HAS FUNDED MORE THAN **425 PROJECTS** IN OVER **85 COUNTRIES** WORLDWIDE AND HAS REMAINED ON THE PULSE OF CURRENT RESEARCH, CONSERVATION AND EDUCATION PROJECTS THAT FOCUS ON SHARKS AND RAYS.



3
centres

SOSF D'ARROS RESEARCH CENTRE
D'Arros Island, Seychelles

SOSF SHARK EDUCATION CENTRE
Cape Town, South Africa

SOSF SHARK RESEARCH CENTER
Dania Beach, USA



5
long-term
partners

**BIMINI BIOLOGICAL
FIELD STATION
FOUNDATION**
Bahamas

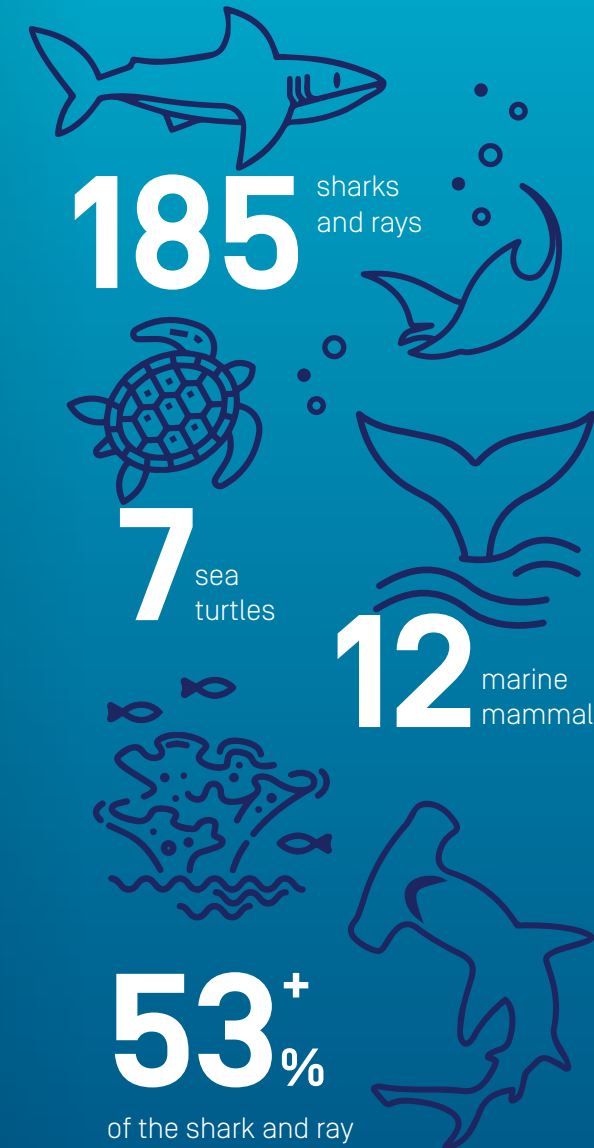
THE MANTA TRUST
UK

SHARK SPOTTERS
South Africa

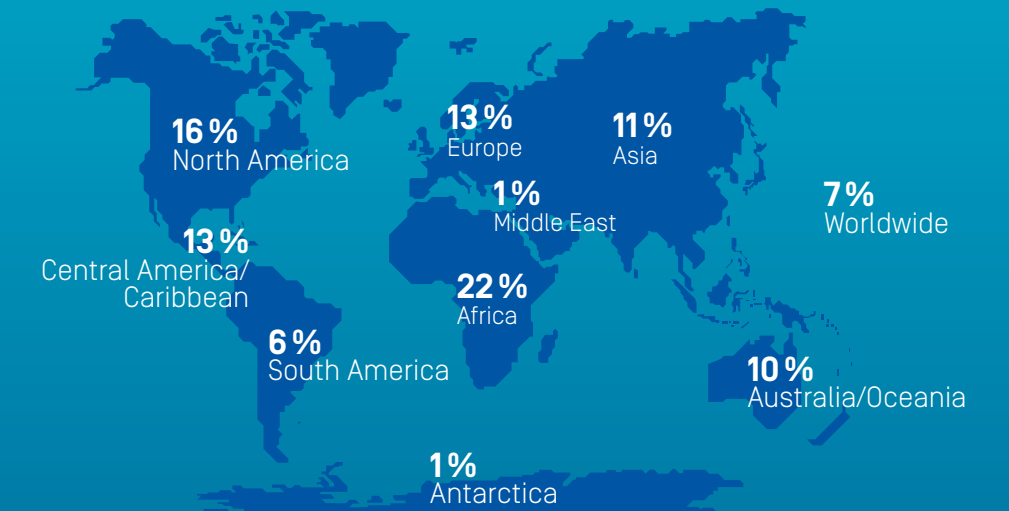
**NORTH COAST
CETACEAN SOCIETY**
Canada

**THE ACOUSTIC
TRACKING ARRAY
PLATFORM**
South Africa

Species funded



425 projects in **85** countries

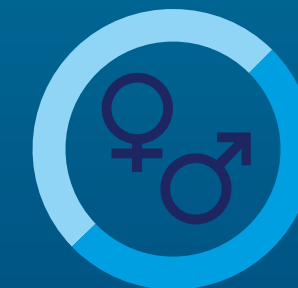


60
projects in 2022

Small Grants ≤ 18 months
Keystone Projects ≤ 3 years
Partners > 3 years

32
years old

Average age of early career professionals supported by Small Grants in 2022.



Grant recipients
49.3% women
50.7% men

WHERE WE WORK IN 2022

THE SAVE OUR SEAS FOUNDATION WAS ESTABLISHED IN 2003 WITH A MISSION TO CREATE A LEGACY OF SECURING THE HEALTH AND SUSTAINABILITY OF OUR OCEANS, AND THE COMMUNITIES THAT DEPEND ON THEM, FOR GENERATIONS TO COME.



AFRICA

CAMEROON

- Citizen science shark conservation, Aristide Takoukam Kamla

CONGO

- Shark and ray protection, Phil Doherty

MAURITANIA

- Shark diversity, Carolina de la Hoz Schilling

NIGERIA

- Baseline data for pincushion ray, Segun Oladipo

SEYCHELLES

- SOSF D'Arros Research Centre
- Coral community monitoring, Nigel Downing
- Habitat suitability for reef sharks, Nico Fassbender
- Seychelles cetaceans, Jeremy Kiszka
- Turtle monitoring, Jeanne Mortimer
- On reef manta time at D'Arros, Rachel Newsome

- Environmental education, Terence Vel

SOUTH AFRICA

- SOSF Shark Education Centre
- The Acoustic Tracking Array Platform, Paul Cowley & Taryn Murray
- Shark Spotters, Sarah Waries
- Great African Seaforest biodiversity, Craig Foster & Jannes Landschoff
- Calculating white shark population size, Anna Simeon

AMERICAS

ARGENTINA

- Pollution : impact on shark reproduction, Franco Cristiani

CANADA

- The North Coast Cetacean Society, Janie Wray

CHILE

- American elephant fish population structure, Francisco Concha

COLOMBIA

- Shark research and monitoring, Malpelo MPA, Sandra Bessudo
- MPAs for bonnethead sharks, María Alejandra Herrera

ECUADOR

- Hammerhead shark nursery, Eduardo Espinoza
- Whale shark migrations, Jonathan Green
- Protecting the sharkiest place on earth, Pelayo Salinas de León

MEXICO

- Kelp forest, sharks and climate change, Emiliano García-Rodríguez
- Cryptic Pacific angel sharks, Alfonso Gonzalez

- Guitarfish trade, Bryan Huerta-Beltran
- Shark fisheries identification LAMP, Alexis Jiménez-Pérez

- Heavy metal effect on shark microbiomes, Miguel Tripp-Valdez
- Local knowledge and education, Nadia Rubio

PANAMA

- Cryptic bonnethead sharks, Cindy Gonzalez

SAINT VINCENT & THE GRENADINES

- Shark fisheries, Catherine Macdonald

THE BAHAMAS

- Bimini Biological Field Station, Matthew Smukall
- Education outreach, Candice Brittain
- FADs and silky shark conservation, Bryan Keller

TRINIDAD

- Scalloped hammerhead community conservation, Kelly Kingon

UNITED STATES OF AMERICA

- SOSF Shark Research Center
- MHC genetics: shark adaptations to climate change, Eloise Cave
- Shark research grants, Lee Crockett
- Archaeology of ancient shark DNA, Eric Guiry
- Survival of sevengill sharks, Meghan Holst

ANTARCTICA

- Monitoring Antarctic Peninsula penguins, Tom Hart

ASIA

BANGLADESH

- Sharpnose guitarfish conservation, Alifa Haque

- Hammerhead shark conservation, Nazia Hossain

BORNEO

- Saving river sharks, Andrew Chin

HONG KONG

- DNA testing in illegal trade, Demian Chapman

INDONESIA

- Giant guitarfish in MPA sanctuary, Faqih Alghozali

- Tourism for shark conservation, Hollie Booth

- Clown wedgefish ground-truthing, Peter Kyne

- Rhino ray conservation management, Een Irawan Putra

- Sawfish baseline survey, Yunita Wakhida

PAPUA NEW GUINEA

- Winghead sharks Kikori Delta, Yolarnie Amepou

EUROPE

IRELAND

- Blue shark reproductive status, Jenny Bortoluzzi

THE MEDITERRANEAN

- Guitarfish fisheries markets, Ali Hood

PORTUGAL

- Whale shark tuna feeding associations, Jorge Miguel Rodrigues Fontes
- Deep-sea shark fishing grounds, Sofia Graça Aranha
- RNA virus diversity in chondrichthyans, Fabiana Neves

SAINT HELENA

- Shortfin mako satellite tracking, Nuno Queiroz

SCOTLAND

- Genetic monitoring tool, Catherine Jones

OCEANIA

AUSTRALIA

- Noise: impact on Australian ghost shark, Lucille Chapuis
- Natal philopatry in bull sharks, Nicolas Lubitz
- Ageing sharks with strontium isotopes, Brandon Mahan

WORLDWIDE

- The Manta Trust, Guy Stevens
- Gill Guardians education, Jasmin Graham

OUR CENTRES

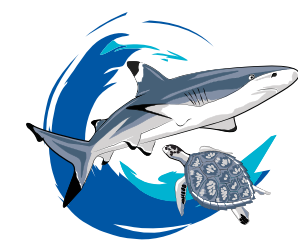
REPORTS FROM THE SAVE OUR SEAS
FOUNDATION CENTRES AROUND THE WORLD

- 1 SOSF D'ARROS RESEARCH CENTRE | SEYCHELLES
- 2 SOSF SHARK EDUCATION CENTRE | SOUTH AFRICA
- 3 SOSF SHARK RESEARCH CENTER | USA





Much of the long-term monitoring at the SOSF-DRC includes different elements that all ultimately assess healthy coral reefs. Tied together, these threads are important to understanding resilience in this region to safeguard Seychelles' future.



save our seas
d'arros research centre



ROBERT BULLOCK



HENRIETTE GRIMMEL

SOSF D'ARROS
RESEARCH CENTRE

DR ROBERT BULLOCK AND HENRIETTE GRIMMEL

The Save Our Seas Foundation D'Arros Research Centre (SOSF-DRC) strives to achieve its vision as a centre of excellence for marine and tropical island conservation. Its mission is to preserve and showcase the ecological integrity of D'Arros Island and St Joseph Atoll through research, monitoring, restoration and education. It is this mission that motivates the activities and research undertaken on this small island of the Amirantes group in Seychelles.

The year of 2022 was defined by new experiences, productive collaborations, hard work and plenty of data. Alongside ongoing long-term monitoring programmes, over the course of the year the centre supported 14 researchers conducting 10 research projects over 21 weeks. The D'Arros Experience brought young Seychellois students to D'Arros to learn about the diversity and wonder of their nation's natural environment, and the SOSF-DRC team continued to learn and grow together, making several interesting discoveries and launching a new research vessel.

Long-term monitoring programmes remain a fundamental component of the SOSF-DRC's activities and the various projects continued in earnest in 2022. Regular monitoring of turtles, mantas, sharks, rays and seabirds still provides critical information about the populations of key species around the islands. With the addition of mangrove restoration work, marine litter surveys and tortoise counts, the team were certainly kept busy.

Several new additions to long-term monitoring were also integrated in 2022, including faecal DNA sampling of sharks, plankton density sampling and standardised atoll drone surveys. Finally, the team reinitiated the annual coral reef survey, conducting more than 30 dives in two weeks in order to collect the data necessary to inform the ongoing assessment of reef health at the site.

The centre supports a range of SOSF keystone projects and several of these began in 2022. Dr Phil Hosegood and his team from Plymouth University, UK, visited the centre in March to deploy oceanographic equipment to investigate internal wave construction and its impact on coral reef health. Keystone project leader and cetacean expert Dr Jeremy Kiszka from Florida International University, USA, spent three weeks leading a team conducting surveys, deploying sound traps and collecting biopsy samples from whales and dolphins around D'Arros and St Joseph. The team recorded 78 sightings and surveyed more than 1,000 kilometres (620 miles). Finally, PhD candidate Nico Fassbender from the University of Western Australia began collecting data for his three-year special keystone grant investigating the relationship between habitat complexity and space use in different species of reef shark. Over six weeks Nico and the team made good progress with data collection, tagging more than 30 sharks and deploying 100 baited remote underwater video systems. As well as these keystone projects, the centre supported various Master's and Bachelor's research studies. Seychellois student Alessia Lavigne, conducting her Master's research with Sheffield University, UK, collaborated with the SOSF-DRC for her novel investigation into turtle egg hatching failures. Priya Didon compared different techniques for measuring manta rays, and previously supported students Sarah Purvis and Saratha Naiken both completed their undergraduate degrees and will produce publications from their research.

Several visiting research groups also collaborated with the SOSF-DRC in 2022. The centre entered into a multi-year collaboration with Dr Renato Morais of the Paris Science and Letters (PSL) University, France, to investigate energetic connectivity between reef and non-reef habitats with the aim of understanding what makes some reefs more productive than others. For several weeks in May Dr Morais collected initial data on the movement paths of reef fishes.

The team recorded 78 sightings and surveyed more than 1,000 kilometres (620 miles)



Opposite: Yasha, a hawksbill turtle, is released on St Joseph Atoll as Dr Jeanne Mortimer looks on.

Below: At the D'Arros Research Centre, long-term monitoring of the region's most iconic species remains a fundamental component of their activities. These species include sharks (below) and manta rays (bottom).





Opposite: With its long-term monitoring programmes continuing unabated, the SOSF-DRC also supported 14 scientists who were conducting 10 research projects over 21 weeks.

Above, left: Keeping tabs on the diversity of life around D'Arros Island and St Joseph Atoll isn't only thrilling; it's essential to ensuring that participation by the SOSF-DRC in the Seychelles Marine Spatial Plan is informed and up to date.

Above, right: A decade of shark-tracking by the SOSF-DRC has seen 184 adult and 882 juvenile sharks PIT-tagged, a scientific contribution that helped to facilitate and inform protection of these waters.



A research team from Ciencia y tecnología marina y alimentaria (AZTI) in Spain arrived in April to conduct a pilot study investigating the impacts of fish aggregating devices, or FADs, on reef structure and communities. These devices are a tool used by commercial fishing fleets and derelict FADs can become entangled on reef habitat with the potential of causing significant damage.

Various SOSF-DRC-associated research articles were published in scientific journals in 2022. These studies include a publication by a previous project leader, Dr Chantel Elston, who used acoustic telemetry to reveal patterns of habitat use in three Dasyatid ray species. The SOSF-DRC team also published a case study investigating the applicability of global Red List data for informing research and conservation on a localised scale.

As well as these published articles, the team made interesting findings about the parasites of sharks and rays and uncovered a novel behavioural tactic used by remoras that involves hiding inside a manta's cloaca. These findings should see publication in the coming year.

The D'Arros Experience brings Seychellois school students to D'Arros to learn about nature, the environment and its conservation at first hand. The 16 winning applicants from the competition held in 2021 arrived on D'Arros in August to explore the island's biodiversity and learn about the importance of

understanding and protecting these national resources. The experience was a roaring success that provided inspiration and insight for students, teachers and researchers alike.

The research vessel *Sicklefin* has served the SOSF-DRC well since 2014, but her age has been showing and the time had come to find a replacement. This took a lot of research, coordination, logistics and patience, but by December the team were able to welcome their new research vessel to the fleet. *Rainbow Runner* will now operate as the centre's primary research vessel.

Sharks International, the largest shark and ray conference in the world, offered a rare opportunity for the team to connect with the rest of the Save Our Seas Foundation staff as well as global shark and ray experts. This was especially valuable for research officers Ellie Moulinie and Dillys Pouponeau, who both had the opportunity to present at such a conference for the first time.

This year saw SOSF-DRC representation at several technical working group and stakeholder meetings for the Seychelles Marine Spatial Plan (SMSP). One key result of this process is the suggestion of a management boundary for St Joseph Atoll, which at the end of the year was only awaiting final approval by the SMSP Steering Committee. The final SMSP is expected to pass into law in early 2023. The centre became an implementing project partner in the SeyCCAT



Left: The SOSF-DRC celebrated its 10th anniversary this year, with some of its scientific milestones marked in this vibrant infographic that evokes the colours of the national flag of Seychelles.

Right: The SOSF-DRC looks set to intrigue eager young hearts and minds, with plans afoot to host the next D'Arros Experience and collaborate with the University of Seychelles.



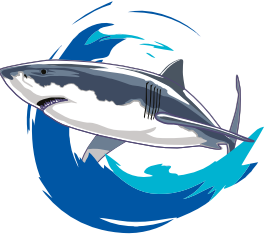
Oceans5 Marine Protected Areas management plan template project. This means that marine protected area plans for D'Arros Zone 1 and St Joseph Zone 2 will be drafted in accordance with a template built on a consultancy and stakeholder process to assess whether a standard plan baseline could be the way forward for the marine protected area network in Seychelles.

2022 was a productive year for the centre, with many important lessons learnt and objectives achieved. Although science and conservation form the basis of the centre's activities, the highlight of the year for the SOSF-DRC team has been the opportunity to work with so many interesting, passionate and innovative people from all walks of life.

Looking ahead to 2023, the centre and the team aim to continue the growth that defined the past year and keenly await new challenges presented by new opportunities. Keystone project leader Rachel Newsome will begin her exciting new research using biologging devices to reveal the activity and behaviour regimes of reef manta rays for the first time. Master's student Alessia Lavigne will level up and become a PhD student, using her newly acquired skills to delve more deeply into the causes of hatching failure in threatened sea turtles and tortoises. The D'Arros Experience will proceed into its second year, building upon the success of the last, and further collaboration with the University of Seychelles should see the development of a student training field course – all in all, a promising outlook.



The Shark Education Centre (SOSF-SEC) staff hosted and interacted with a record 8,000 people through its various programmes and other opportunities it offered in 2022.



save our seas
shark education centre



CLOVA MABIN

SOSF SHARK EDUCATION CENTRE

DR CLOVA MABIN

The Save Our Seas Foundation Shark Education Centre (SOSF-SEC) aims to connect the public with the ocean through experiential education programmes that focus on sharks and local marine ecosystems in order to nurture awareness, encourage environmentally responsible actions and develop a healthy respect for sharks. This ocean connection can be fostered during an interactive shark lesson, while exploring the rock pools of our local marine protected area or snorkelling through the kelp forest as part of our Marine Explorers programme, or even during a guided tour of the facility. The ultimate goal is to create a love for the ocean and inspire people to protect it.

The SOSF-SEC follows a four-pronged educational approach: lessons for school groups conducted onsite and offsite; guided tours of the Shark Education Centre; the production and distribution of educational materials to extend the learning process outside our contact time; and the continuation and development of several medium-term educational programmes.



Above, left: With 2,392 schoolchildren visiting the SOSF-SEC, the continued need for a place to foster curiosity, encourage enthusiasm and inject passion and fun into learning was evident.

Above, right: There were 1,420 visitors to the SOSF-SEC's interactive facilities in 2022.

Opposite: The work of the SOSF-SEC relies on dedicated staff who are attuned to the diversity of the learners and visitors wanting to explore the world of sharks, False Bay and conservation.

EDUCATIONAL PROGRAMMES

We reached a new milestone in 2022 when approximately 8,000 people had in-person interactions with our education team!

During the year, the SOSF-SEC focused on bringing schools back to our facilities rather than visiting the schools at their locations. We still offered this outreach option to schools further from the centre or as an introduction to new schools whose staff wanted a sample of our programmes. However, most of our educational engagement (teaching days) occurred onsite at the SOSF-SEC. In 2022, we reached a record number of learners in our short-term programmes (2,392 schoolchildren visiting the centre, 2,685 children reached offsite and 359 teachers). An additional 461 people (adults and children) received educational programmes onsite.

In 2022, we ran two successful 10-week Marine Explorer programmes, taking 22 high school learners on a journey of connecting with the ocean. The children came from two groups: the Lawhill Maritime Centre at Simon's Town High School and Sibelius High School in Retreat.

we reached a record number of learners in our short-term programmes (2,392 schoolchildren visiting the centre, 2,685 children reached offsite and 359 teachers).





Far left: The tidal pools built into the rocky shores around the Cape Peninsula offer safe and enchanting first encounters for the young underwater explorers who joined the SOSF-SEC Marine Explorer Programme.

Left: The SOSF-SEC ran two successful 10-week Marine Explorer Programmes in 2022, but found that access for many learners (especially girls) was limited by their inability to swim. This is a challenge we intend to explore and address in 2023.

The latter was a new school partnership, which we hope to continue. One of the prerequisites for learners who are considering participation in this programme is that they are competent swimmers. However, this is a limiting factor for many children (especially girls) who want to participate in the programme but have never learnt to swim. We want to explore this issue further in future years, potentially looking at facilitating a learn-to-swim programme in a local community.

2022 also marked the launch of a new after-school programme for primary school learners: the Sea School. This 10-week programme was piloted with a group of 20 Grade 5 learners from a local school and covered two terms (one focusing on the rocky shore and the other on sharks). The lessons were craft-based, some in the classroom and some on the shore. We hope to build on this in 2023 by inviting another school to participate.

For most of the year we continued to offer the guided tour format of visits to members of the public. However, as our primary focus remained on school groups, we scheduled the tours for times that did not conflict with our other programmes. In total, we had 1,420 visiting members of the public.

Our recently launched Ocean Ambassador programme continued in the Strandfontein, Bayview and Mitchell's Plain communities in 2022. The programme aims to reach new audiences (adults and children) in under-resourced communities. It involves identifying key individuals in these communities and offering them training to share information and engage their peers in ocean conservation. Dr Koebraa Peters was our first ambassador in the area and she led four beach clean-ups and one indoor event in 2022, with a total of 152 attendees across the year. We hope to introduce our next ambassador in 2023, as well as to continue working with Koebraa.

BUILDING VIRTUAL CONNECTIONS

In 2022 we continued to grow our social media networks and had many new followers across our four platforms, with 426 on Facebook, 628 on Instagram, 191 on LinkedIn and 315 on Twitter.

Whether in the classroom, engaging with state-of-the-art installations (right) or getting hands-on in the field (opposite), connection is at the core of the SOSF-SEC's work.

CONFERENCES AND SPECIAL EVENTS

Aside from our educational activities at the SOSF-SEC, we attended some conferences during 2022. The Marine and Coastal Educators Network (MCEN) national conference was virtual again this year. We also relaunched the MCEN regional conference for the Western Cape, which the SOSF-SEC hosted with 35 people in attendance. We hope this will become an annual event again and that the SOSF-SEC can continue to play an instrumental role.

I was very fortunate to attend Sharks International 2022 in Spain. This three-day, in-person event included presentations on the latest shark science, workshops and networking opportunities. I presented a topic that is close to my heart: 'Challenges in developing ocean stewardship in young people from under-resourced communities'. It allowed me to discuss our work in South Africa on an international stage and led to fruitful conversations with other delegates afterwards.

I engaged with several adult groups during 2022. The first was the Wavescape Festival Slide Night, where I discussed how Covid-19 changed our connection with nature. The International Ocean Institute of Southern Africa held a course about ocean governance for participants from government departments across Africa. Their visit to the SOSF-SEC was an excellent opportunity to showcase our work, discuss the challenges to shark conservation and the participants' roles in the future of sharks.

We continued collaborating with various partners during 2022, including WWF, the Two Oceans Aquarium Education Foundation, the 9MilesProject, Shark Spotters and the Good Machine. We also hosted our first Women's Day event in August. We invited a group of 20 young women from the Lawhill Maritime Centre who could not participate in our Marine Explorers programme as they could not swim. This day included several inspirational talks, but the highlight was a controlled floating session in the St James tidal pool – a chance to peek beneath the surface safely.

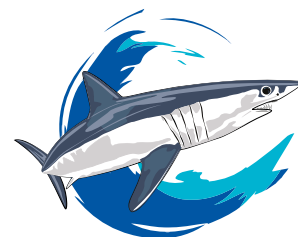
LOOKING FORWARD

We look forward to expanding into our medium-term programmes (Sea School, Marine Explorers and Ocean Ambassadors) during 2023 and exploring options for long-term (multi-year) programmes. We also plan to focus on developing our exhibits and resources.





The Shark Research Center (SOSF-SRC) continued to break new ground in 2022, charting paths to decipher shark genomes and to identify genetically distinct shark populations and decipher their migration patterns.



save our seas
shark research center



MAHMOOD SHIVJI

SOSF SHARK RESEARCH CENTER

DR MAHMOOD SHIVJI

The Save Our Seas Foundation Shark Research Center USA (SOSF-SRC) is an integral part of Nova Southeastern University (NSU), Florida, functioning as an academic unit of the NSU Halmos College of Arts & Sciences. The SOSF-SRC is one of the three global Save Our Seas Foundation centres, with a mission to conduct advanced marine conservation science research and provide graduate student and postdoctoral level research opportunities.

The SOSF-SRC uses an integrative, multi-disciplinary approach to its research programmes, employing methods from genetics, genomics and ecology to obtain a scientifically holistic understanding of sharks for conservation planning.

In 2022, the SOSF-SRC's activities continued to focus on our overarching, long-term mission of conducting research on sharks in three broad areas: deciphering whole genomes of sharks; identifying genetically distinct shark populations; and determining migration patterns of sharks.

DECIPHERING WHOLE GENOMES OF SHARKS

The famed great hammerhead shark *Sphyrna mokarran* is instantly recognisable by its large size (up to 6.1 metres; 20 feet), expanded head and impressively large first dorsal fin. This species occurs globally in tropical oceans, but its numbers have declined precipitously due to overfishing for the high market value of its fins and its low survival rate when caught even incidentally in fisheries. Given these declines, the great hammerhead has been assigned Critically Endangered status by the IUCN Red List. Despite its dire status, genetic knowledge of great hammerheads to inform conservation planning is minimal. In 2022, working with collaborators from multiple universities and using a suite of genomics methods, we completed development of the first high-quality assembly of the entire genome of the great hammerhead shark. This research showed the great hammerhead genome to be close in size to the human genome, but also revealed a disconcertingly high level of inbreeding and exceptionally low genetic diversity and effective population size (that is, the ideal breeding population size). These results raise strong concerns about the genetic capacity of the remaining small populations of great hammerheads to adapt to the rapidly changing ocean conditions caused by climate change.

In 2022, we also completed decoding the entire genome of a second endangered shark species, the shortfin mako shark *Isurus paucus*, also at high-quality, reference-level resolution. The shortfin mako is globally distributed in temperate and tropical oceans, makes massive, cross-ocean migrations and is reputed to be the fastest swimming of sharks. The mako genome was discovered to be enormous in size (about 5 billion base pairs, so nearly 1.7 times the size of the human genome!). But the genome's decoding also provided some good news, revealing a much higher genetic diversity and effective population size than the great hammerhead. This suggests that if properly managed to prevent further overfishing, the shortfin mako can recover from its currently reduced population sizes.

These decoded genomes of the great hammerhead and shortfin mako sharks were published in the online journal *iScience* and represent only the second and third cases of chromosomal-level shark genomes published to date. The genome assemblies provide a reference resource for use by the worldwide science community to better understand the biology of these endangered sharks to help devise improved conservation measures based on the most up-to-date biological information.



While news for the great hammerhead (top) was disheartening, it was slightly more hopeful for the short-fin mako (above) in 2022. The SOSF-SRC decoded both species' whole genomes, highlighting huge declines and low diversity for the hammerhead but higher diversity for the mako, suggesting that it could recover if properly managed.

Opposite: The SOSF-Shark Research Center team, led by Professor Mahmood Shivji (left), comprises (left to right) Nina Pruzinsky, lab manager; Maria Herrera, graduate student; Dr Jeremy Vaudo, research scientist; Elizabeth Saraf, graduate student; Ryan Logan, graduate student. Research scientist Dr Andrea Bernard is not shown.





Opposite: An award in environmental education for Professor Mahmood Shivji, the director of SOSF-SRC, sits proudly next to a mounted shark jaw. It is a reminder of the dual importance of scientific research and outreach.

Above, left: One of the many ways to obtain genetic material is to analyse shark products found in fish markets, like this dried fin. Even such a small body part can reveal so many things, such as where this individual came from and the genetic health of its population.

Above, right: The hallmark of the SOSF-SRC is that it takes an integrative, multi-disciplinary approach to shark science, combining state-of-the-art techniques in genetics, genomics and field work.

POPULATION GENETIC/GENOMIC DYNAMICS OF EXPLOITED LARGE-BODIED SHARK SPECIES

We continued our research to identify genetically distinct populations and their levels of genetic diversity for three species of globally occurring, large-bodied apex predator sharks that have been overfished and are thus of high conservation concern: the scalloped hammerhead shark *S. lewini* (IUCN Critically Endangered), the great hammerhead shark (IUCN Critically Endangered) and the shortfin mako shark (IUCN Endangered). Understanding the genetic relationships between sharks of the same species but living in different parts of their global distribution is essential because sub-sets (populations) of species from different regions become adapted at the DNA level to their specific environments. Thus, identifying and conserving such genetically unique sub-sets of shark species is of key importance as their uniqueness preserves the evolutionary resilience of species to survive rapid environmental changes occurring in the oceans.

In this area of research, we completed a study on the population genetic dynamics of scalloped hammerhead sharks in the wider Eastern Tropical Pacific and globally. This work included obtaining the first genetic assessment of

hammerhead individuals that form the renowned aggregations at Wolf and Darwin islands in the Galápagos archipelago. This project entailed a geographically far-reaching, multi-institutional, multi-country collaboration and was published in the scientific journal *Ecology & Evolution*. A news story on the main findings of this research was developed with the Save Our Seas Foundation and featured on its website's Ocean News page ('It's all in the genes').

We also completed DNA sequencing and characterising the entire mitochondrial genomes of three shortfin mako sharks from globally widespread regions. This work was part of the Master's degree thesis of an NSU graduate student in the SOSF-SRC and was published in the journal *Mitochondrial DNA Part B*. The results established the basis for conducting extended research on a population genomics assessment of shortfin mako sharks throughout the Atlantic Ocean.

Following on from the above project, we completed genomics scale (nuclear and mitochondrial) data acquisition and analysis of shortfin mako shark populations throughout the Atlantic and presented the data at the Sharks International Conference 2022 held in Valencia, Spain, in October. This population genetic information is of particular interest for international fisheries management.

Long-term collaborations help facilitate the investigation of the movement patterns of hammerhead sharks (right), as well as silky sharks.

The data on the silky shark were presented at the October 2022 Sharks International Conference.

Finally, we completed our data collection and analysis work on a global population genomics assessment of the great hammerhead and also presented it at the October 2022 Sharks International Conference. The results demonstrate the presence of several distinct populations, all of which need urgent conservation effort, particularly considering the high levels of inbreeding indicated by our decoding of this species' entire genome.

MIGRATION PATTERNS OF SHARKS

The SOSF-SRC has a long-term programme that combines the genetics and genomics approaches described above with the study of the actual movements of sharks, which are determined by electronic tag-based tracking, to obtain a comprehensive understanding of shark migration patterns and population connectivity. To this end, in 2022 the SOSF-SRC continued working in collaboration with the NSU's Guy Harvey Research Institute and Dr Pelayo Salinas de León to extend our research into the movement ecology of the scalloped hammerhead shark and the silky shark *Carcharhinus falciformis* (IUCN Vulnerable) based at the Galápagos Islands. The data on the silky shark were presented at the October 2022 Sharks International Conference. These studies are ongoing, with more satellite tags scheduled to be deployed on silky and hammerhead sharks in mid-2023.



OUR PARTNERS

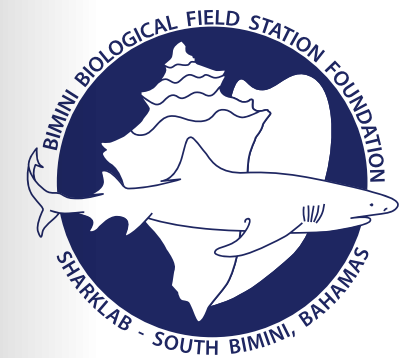
REPORTS FROM THE SAVE OUR SEAS
FOUNDATION PARTNERS AROUND THE WORLD

- 1 **BIMINI BIOLOGICAL FIELD STATION FOUNDATION** | MATTHEW SMUKALL
- 2 **THE MANTA TRUST** | GUY STEVENS
- 3 **SHARK SPOTTERS** | SARAH WARIES
- 4 **THE NORTH COAST CETACEAN SOCIETY** | JANIE WRAY
- 5 **THE ACOUSTIC TRACKING ARRAY PLATFORM** | PAUL COWLEY AND TARYN MURRAY





BBFSF students and guests free-dive with a great hammerhead shark.



MATTHEW J. SMUKALL

BIMINI BIOLOGICAL FIELD STATION FOUNDATION

MATTHEW SMUKALL

The Bimini Biological Field Station was established in 1990 by Dr Samuel Gruber to advance our knowledge of elasmobranch fish fauna (sharks and rays); to educate future scientists; and to disseminate our research to advance the field of marine science and raise public awareness about sharks. Today the legacy of Dr Gruber endures through the Bimini Biological Field Station Foundation (BBFSF), which supports the Bimini field station (Shark Lab), research in The Bahamas and Florida, educational programmes, the development of early career scientists, and public outreach. This executive summary serves as an update of our activities and to highlight the accomplishments of the BBFSF in 2022, which have been made possible by the generous support of the Save Our Seas Foundation.

RESEARCH

Over the past two years, nearly all the research activities of many organisations have ceased within The Bahamas. The passing of the Access and Benefit Sharing legislation in 2021 was intended to ensure equitable benefits to local communities from research operations and to regulate commercial enterprises or economically valuable discoveries.

However, these new regulations have dramatically impacted research activities for local scientists, not-for-profit organisations, universities and international collaborations. Unfortunately, the new permitting process has been accompanied by numerous delays, technical challenges and uncertainty about regulatory policies. As a result, many research groups have struggled with the new regulations and have been unable to conduct research or only under severely restrictive conditions. The BBFSF has remained engaged with other research groups in efforts to facilitate an improved permitting system in The Bahamas for the future.

The BBFSF Vemco acoustic array currently encompasses 65 receivers in habitats surrounding North Bimini and South Bimini islands and continues to provide valuable data for both BBFSF researchers and collaborators. The Vemco array was downloaded and new batteries installed in December 2021 and therefore remains operational. Thanks to the support of the Save Our Seas Foundation, the BBFSF has been deploying Vemco V16 acoustic transmitters in sharks and rays, which provide up to 10 years of telemetry data in the waters surrounding Bimini, as well as through a network of collaborative receivers in the region. The data obtained from these telemetry efforts indicate a high degree of connectivity between The Bahamas and the Florida Keys, and that this area is an important corridor for several species such as bull, great hammerhead and tiger sharks. It is hypothesised that this connectivity may be in part driven by parturition.

Our tagging efforts in 2022 focused on the Florida Keys area, where five bull sharks and one great hammerhead were tagged with acoustic transmitters and two great hammerheads were fitted with SPOT satellite tags. An additional tagging trip is scheduled for February 2023. These trips also provide the opportunity to collect important biological samples from sharks, which are contributing to numerous ongoing collaborations.

The data obtained from these telemetry efforts indicate a high degree of connectivity between The Bahamas and the Florida Keys...



Top: A spotted eagle ray swims in the shallow water around Bimini.

Above: Researchers retrieve some of the nearly 60 acoustic receivers that comprise the telemetry array surrounding Bimini.

Opposite: With the aid of a model hammerhead, a member of the BBFSF crew talks about shark research and data collection techniques to local students in Bimini.



EDUCATION
EARLY CAREER SCIENTIST SUPPORT

The BBFSF remains committed to educating the next generation of marine scientists and providing opportunities for them to acquire much-needed practical field skills. Station crew assist with all aspects of operating a research station, including boating skills, leading field groups, assisting with education and engaging the general public. Students move on from the Bimini Shark Lab well prepared to advance in careers for research, education, public outreach and marine conservation.

We are currently supporting the doctoral research of Molly Kressler from Exeter University, and the Master's thesis research of Emily Cormier from Dalhousie University and Jasmine Nyce from the University of Alaska Fairbanks. Molly's research focuses on habitat selection models for juvenile lemon sharks in comparison to predictions from ecological energy models. Emily is using satellite imagery and habitat classification maps to quantify the habitat loss in the Bimini lagoon over the past two decades and the impact this has had on juvenile

lemon shark abundance, growth and foraging ecology. Jasmine is analysing the regional movements of acoustically tagged bull sharks over the past 10 years. Given the challenges and uncertainty of research permits in The Bahamas, these students are relying upon datasets and samples collected before the moratorium on research. We are also providing biological samples for Jack Dales from Jacksonville University and Shannon Barry from Florida Institute of Technology.

Station assistants at the Shark Lab are also given the opportunity to lead independent projects and publish the results. Kylie Bostic and Baylie Fadool are analysing nurse shark growth rates from Bimini. Baylie will also be investigating the hormone levels of pregnant nurse sharks. Alina Hussey is using stable isotope analysis to investigate the trophic interactions and ecological overlap of sharks and rays around Bimini. Former BBFSF students Maurits Van Zinnicq Bergmann, Felicie Dhellemmes, Vital Heim, Clemency White and Matthew Smukall continue to analyse datasets with a view to completing their projects and submitting the results for publication early in 2023.

Below: BBFSF crew members host a local school group to describe what goes into marine research, conservation and habitat protection.



Below, right: Outreach events, where shark research and conservation are explained to members of the public, are part of the BBFSF mission.



Opposite: Learners from a visiting school group wade with southern stingrays and nurse sharks under the guidance of a BBFSF team.



COURSES

In 2022, we welcomed six college courses focusing on shark biology and tropical marine ecology. These were from Coastal Carolina University, University of Minnesota and Florida Southern College, as well as three courses from Eckerd College. We also hosted two field excursions for members of the general public. These field excursions and courses provide a platform for BBFSF staff and crew to teach the participants about our ongoing research and conservation initiatives.

In August 2022, we hosted our first inaugural Teacher & Educator Naturalist Course, supported by the Save Our Seas Foundation. Co-instructed by Dr Dean Grubbs and Matthew Smukall, the course was designed to offer teachers and educators the opportunity to learn about shark biology, research methods and marine conservation efforts. We were pleasantly surprised that we received more than 250 applications for this opportunity. Fourteen teachers and educators from around the USA, Canada and The Bahamas were selected for scholarships based on their personal backgrounds, how they planned to incorporate the experience into their teaching and their ability to engage diverse student groups, including traditionally underserved communities.

The week in Bimini was filled with shark biology and conservation lectures, balanced with field excursions to see sharks and rays in the wild. The response from participants was overwhelmingly positive and highlighted the limited

opportunities for field-based career development that many marine educators have. These opportunities can be particularly challenging for those who live far from the ocean and who do not have the financial or logistical means to travel to areas for marine research experiences. Some participants had never swum in the ocean before the trip, let alone with sharks. The Bahamian educators were incredibly grateful for the experience. Although the islands of The Bahamas are surrounded by ocean, many in the country do not spend time in the marine environment or they have preconceived fear of sharks. Following the week in Bimini, the teachers are now able to share their positive experiences with their students and show that marine science can be for everyone. These educators have the ability to reach hundreds, or potentially thousands, of students in future years, helping to spread the message of marine conservation and improve the inclusivity of marine science for future generations. We remain in communication with several of the participants, providing further support for their educational activities.

An Art Meets Science workshop was hosted in November 2022, welcoming 15 participants to Bimini for a week of field excursions and talks about science, conservation and art techniques. Art can be a powerful platform for communicating conservation messages and this opportunity helped to inform artists about marine science and conservation topics. Participants are now in a position to share that information in an impactful way, spreading important messages through artistic media.



OUTREACH

Social media and virtual meetings continue to be important means to engage with people and groups from around the world. Social media provide a platform for us to share science and conservation messaging to our following of more than 120,000 people across Instagram, Facebook and Twitter. In 2022 we used virtual meetings to speak with approximately 1,300 elementary to high school students about our research, general shark biology, scientific methodology and marine conservation. We also hosted more than 250 members of the public for tours of the field station. Our outreach team continues to support the local schools through in-person presentations, as well as open days to the Shark Lab. We communicate with the broader general public by participating in conservation events such as Rock the Ocean Music Festival, Stoked on Salt Festival and Nat Geo's Shark Fest Shark Con. These large gatherings provide the opportunity to disseminate conservation messages to thousands of patrons.

SCIENTIFIC OUTPUT

The BBFSF continues to produce peer-reviewed scientific publications from data acquired in Bimini, as well as through regional collaborations. In 2022 we contributed to several ongoing projects ranging from regional movements to

the genetic structure of sharks, which resulted in nine peer-reviewed manuscripts accepted for publication and an additional two currently in review. We continue to collaborate on research projects and apply new analytic techniques in order to leverage our data for the most impact on the conservation and management of sharks and rays.

The current restrictions on research in The Bahamas have presented unprecedented challenges for the BBFSF, collaborators and other local research groups. However, we are continually working to restore research activities and resume many of our long-term projects, as these are some of the longest and most robust datasets of sharks and rays. The Bimini Biological Field Station has overcome other challenges over the past three decades and we remain confident that we will endure this current challenge as well. We believe Bimini's healthy and diverse marine ecosystems continue to offer a unique setting for educational and outreach activities. We have therefore been focusing additional efforts on our education and public outreach missions. These new efforts for education and outreach will continue even with the resumption of research activities, thereby expanding the already dynamic missions of the BBFSF. From everyone at the BBFSF, I extend our gratitude for the continued support of the Save Our Seas Foundation and we look forward to a continued partnership, hopefully for years to come.

Opposite: Students visiting on a college course wade with juvenile lemon sharks in the mangrove shallows near Bimini.

Right: A southern stingray swims along shallow sea-grass flats.





A researcher attempts to capture an ID photograph of a passing manta ray in the Maldives. Mantas can be identified by the pattern of spots on their underside, which is as unique as a human fingerprint.



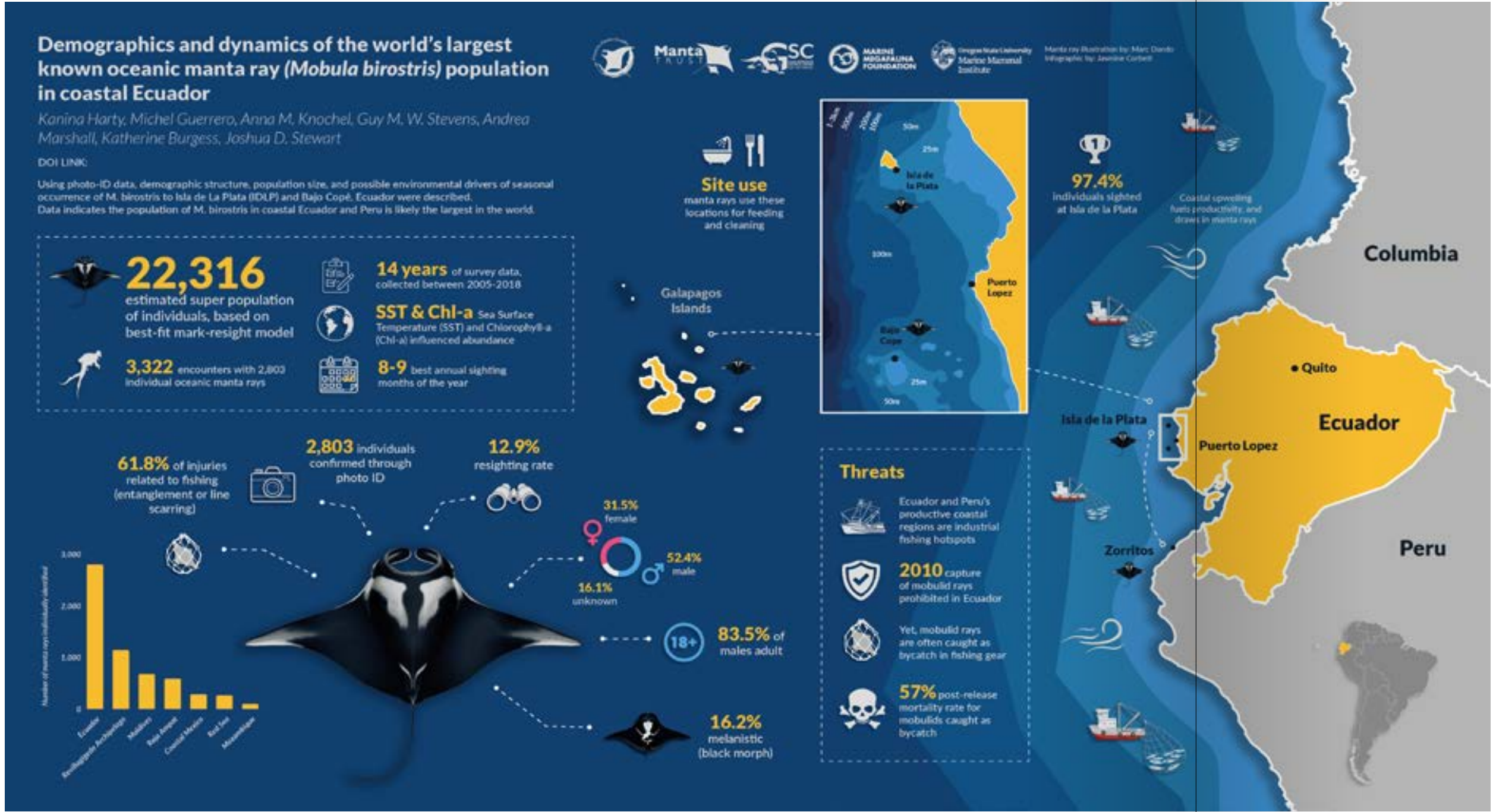
GUY STEVENS

THE MANTA TRUST

DR GUY STEVENS

After a pause in field activities in 2020 and 2021 due to the global pandemic, in 2022 we have been able to slowly resume our work in the field. This has been an important morale booster for our teams, and getting back into the water with the gentle giants has provided hope that we will continue to collect important data that will improve our understanding of these beautiful and enigmatic creatures. In some places, though, recovery of tourism is still slow and many of our resort partners where we carry out our work are operating at limited capacity. Our team members are our most invaluable asset and thanks to their dedication and efforts we have been able to continue producing important results and carrying out the work that will allow us to drive positive action for mobulids.

All manta and devil rays are now listed as Vulnerable or Endangered on the IUCN's Red List of Threatened Species, due primarily to the devastating impact of target and bycatch fisheries around the world. Our research and conservation efforts are therefore more vital than ever before. In 2022 the Manta Trust continued to drive progress on the enforcement of policies and management plans for mobulid rays, conducting critical field research, publishing our findings in peer-reviewed, open-access journals, developing our educational outreach and growing our global network of collaborators.



CAPACITY BUILDING AND LEGISLATIVE ACTIONS

We continue to develop working relationships with governments in mobulid range countries around the world, providing them with the vital data they need to improve protective measures. In the Maldives, six ecologically significant sites in Laamu Atoll in the Maldives were designated as marine protected areas, one of which, L. Maabaidhoo Koaru, encompasses an important manta ray cleaning station.

We have registered the Maldivian Manta Ray Project as a Maldivian NGO, renaming it the Maldives Manta Conservation Program and assigning a board of Maldivian directors. This further instills in the local community a sense of ownership of manta ray research and marine conservation nationally.

We remain focused on building capacity for the enforcement of policies and management plans. We started working with the African Marine Mammal Conservation Organisation (AMMCO) to learn about shark and ray fisheries in Cameroon. We held a knowledge-exchange workshop and trained AMMCO in data collection and methodologies. In Asia, we have trained a local, Egin G Salim, to take over management of the Indonesia Mobula Project, which is working closely with fishers in Muncar, East Java, to reduce shark and ray bycatch by creating market incentives.

Left: The world's largest population of oceanic manta rays was identified in coastal Ecuador as part of a study led by Proyecto Mantas Ecuador, a Manta Trust-affiliated project, in collaboration with the Manta Trust, the Marine Megafauna Foundation and Oregon State University.

Below: Jinaad Ali, a Manta Trust assistant project manager in Laamu Atoll, Maldives, updates community members on the Manta Trust's latest findings in the region, at the annual meeting of Eku Eky (meaning "better together" in the local language, Dhivehi).





Above: Zaalif and Shareef, children from Makunudhoo Atoll in the north of the Maldives, join the Manta Trust team for a research experience day.

Right: Shareef swims with a reef manta ray for the first time. During the research experience day he helped to collect data and learned about the Manta Trust's code of conduct on how to swim with manta rays without disturbing them.

We recently created the Local Island Fund for the Environment (LIFE) in the Maldives, an innovative programme to establish research and education projects in remote fishing communities and to provide training and opportunities for locals to upskill. We successfully piloted this project in Makunudhoo, gaining new insights into an unstudied manta population and forming a strong bond with the local community, who assisted in our research and participated in educational outreach.

This year's Cyclone Grant was awarded to the Mobula Conservation Project based in Baja California, Mexico, to support a student project that is using genetics to determine whether mobula rays are being illegally sold under the general term 'ray' in fish markets and stores. During the expedition in July, a ban on selling cartilaginous fish, which includes sharks and rays, was enforced in Mexico, yet '*mantarraya*' was still sold in the markets. The team took some samples from the market for genetic sequencing back in the lab in Santa Cruz to determine which mobulid species produced these samples.



A reef manta ray cruises through the lagoon of Makunudhoo Atoll in the north of the Maldives, where the Manta Trust began conducting research in 2022.



RESEARCH OUTPUTS

At the end of 2021, the Manta Trust team conducted an 18-day expedition to the far northern atolls of the Maldives, an understudied region with minimal data on mobulids. We discovered an important new reef manta ray aggregation site in Makunudhoo Atoll, and in March 2022 we revisited this atoll to investigate the possibility of establishing a new research base there in collaboration with the local community. So far, the team has identified more than 200 manta rays that are new to the Maldives database, and other individuals that were seen in Makunudhoo have been previously spotted in Baa, Raa, Ari, Lhaviyani, Haa Dhaalu and Haa Alifu atolls. These preliminary findings are proving what a significant location Makunudhoo is for manta ray connectivity in the Maldives. The community is enthusiastic about this project and is looking forward to receiving the team again in 2023.

The Manta Trust’s Maldivian Manta Ray Project examined thousands of photo-ID sightings to show that although mantas in the Maldives are protected nationally, fishing gear entanglement and boat strikes pose a significant threat to these animals, especially in busier atolls with more tourism and fishing activities.

During our team’s visit to Cameroon to work with AMMCO, we were able to study two specimens believed to be the endangered East Atlantic pygmy devil ray *Mobula rochebrunei*, which has not been verifiably recorded since 1960. We have taken morphometrics and genetic samples to confirm their identity.

Around the world, our affiliate projects have provided some very exciting results. In Revillagigedo Archipelago in Mexico, our partners found that a quarter of the population at this well-known oceanic manta aggregation site are black morph, much higher than elsewhere in the world. Their work also suggests that Revillagigedo National Park is an important refuge for oceanic manta rays during El Niño events, counterbalancing the negative effects observed elsewhere in the Eastern Tropical Pacific. In Fiji, Luke Gordon documented the occurrence of oceanic mantas in Fijian waters for the first time and found a critical foraging habitat for the species of interest not only for Fiji, but for the wider South Pacific region.

SCIENTIFIC PUBLICATIONS

Thanks to our collaborations, this has been a fruitful year for scientific publications, with 14 peer-reviewed papers published so far and more in the pipeline. All these publications represent years, even decades, of data collected by our researchers and advance our understanding of these species and the threats they face. For example, the study led by Kanina Harty and Michel Guerrero was a large collaborative effort that took 14 years of data from coastal Ecuador to show that this is the world’s largest population of oceanic manta rays, 10 times larger than any other known population. Another large collaborative study, this time in the Philippines, made use of 16 years of research and citizen science data to create a national database in this poorly studied country and identified 22 manta aggregation sites, four of which are under some form of protection.

We have created a policy to ensure that every peer-reviewed publication that the charity has led is published through open access sources. This has cost significantly more in publication fees, but we believe it is vital that our research be freely available to anyone globally.

AWARENESS AND EDUCATION

Our educational work has continued to expand in 2022, particularly in the UK. In April we welcomed Jen Spacagna to the team in the role of education manager, replacing Flossy Barraud who left the position to undertake a PhD. A big part of Jen’s work has been developing a comprehensive education and diversity strategy to provide guidance and clarity to the Manta Trust team and affiliate projects in these key areas.

This year has seen a large increase in our outreach to schools and other educational establishments. Since the start of 2022, we have engaged with

This year has seen a large increase in our outreach to schools and other educational establishments.

more than 2,500 children and young people in the UK alone, via a combination of virtual and in-person outreach, and have received some excellent feedback. In addition, we have delivered virtual outreach sessions to a small number of schools overseas in locations such as Tanzania, Japan and the USA.

In November, we released the first issue of our quarterly education newsletter. This newsletter is designed with teachers and other education professionals in mind and the November issue had a focus on careers.

ATTENDANCE AT CONFERENCES AND EVENT

Throughout the year we attended dive shows in France, Italy, Dubai and Singapore, and presented at a street festival in Cameroon in June. Director of operations Bex Carter and education manager Jen Spacagna attended the World Oceans Day event at the National Maritime Museum, where we had a stall and delivered a well-received talk.

For World Manta Day 2022, we held manta-themed activities with our resort partners in Maldives and French Polynesia. In the UK, Jen hosted a virtual talk for families.

GLOBAL NETWORK AND COLLABORATIONS

The Manta Trust’s global network of affiliate projects continues to grow as we established a new research project in Costa Rica and welcomed the Proyecto Manta Pacific Network to our network. We secured funding from the Paul M Angell Foundation, the Enjoolata Foundation and Once a Year, and we continue our partnership with corporations like Carl F Bucherer and Salesforce.

None of this would have been possible without the support of the Save Our Seas Foundation grant and team, and we would like to say a huge thank you to you all.



Thanks to easing restrictions and the resumption of normal activities as the Covid-19 pandemic waned, the Shark Spotters achieved 365 full days of safety over 12 months in 2022.



SARAH WARIES

SHARK SPOTTERS

SARAH WARIES

With the coronavirus pandemic finally fading into the background, we were extremely grateful to have managed to achieve a full 365 days of safety operations in the past 12 months. During this time, we continued spotting in Cape Town on six beaches during the spring/summer months and four beaches during winter, and deployed the Fish Hoek shark exclusion barrier on 136 occasions.

The spotters recorded 111 bronze whaler shark sightings at our operating beaches in the past 12 months. The presence of white sharks in the bay was confirmed on three occasions: once by a sighting from our research vessel and twice by detections of acoustically tagged white sharks on our receiver array. Although fewer white sharks were seen or detected in comparison to years gone by, the fact that they still occur highlights the potential risk for human–shark conflict and reinforces the need for the early warning system that our current spotting programme provides. In addition, these sightings emphasise the value of the ongoing research that we are conducting in False Bay. Coupled with our ability to communicate ground-breaking information effectively through our education programmes, peer-reviewed publications and social presence, we have emerged from pandemic-stricken times stronger than ever.



Public engagement increased from 3,000 individuals in 2020–2021 to more than 4,800 people in 2021-2022. Education forms a vital part of the Shark Spotters' programme.

While the expansion of sustainable shark bite mitigation measures to other locales is always a positive step, Shark Spotters' expansion to Plettenberg Bay in 2022 came under unfortunate circumstances. After two fatal shark incidents occurred at Plettenberg Bay between July and September 2022, we were asked by the municipality and a local shark action group to provide our expertise to mitigate such incidents in the future. We have since conducted extensive site inspections and rolled out a spotting programme that covers five busy beaches, have employed and trained 14 local spotters and have brought on board a local operations manager, almost doubling our shark safety footprint in South Africa. Our Plettenberg Bay spotters have recorded multiple white shark sightings since being operational in the area, as well as large schools of more than 30 bronze whaler sharks and other marine megafauna. The programme is being well received by the local community and we hope to continue to learn, adapt and deliver an effective service to the Plettenberg Bay locals into 2023, when we would love to spread the positive and sustainable impact that Shark Spotters is renowned for.





Opposite: The Shark Spotters not only are a familiar presence at spotting sites on the mountainside, but are well-known figures who, in cooperation with the Coastal Conservation team, do intervention work like installing litter traps, stabilising sand dunes and removing ghost fishing gear.

Left: Big or small, all marine creatures fascinate the Shark Spotters! Our team members underwent in-depth marine ecology training this year with the Two Oceans Aquarium to give them a better understanding of marine organisms and their roles in the oceans' ecosystems.

Our Coastal Conservation team has continued to provide much-needed proactive and reactive conservation interventions in the greater Cape Town area in the past year and has become integral to the City of Cape Town's coastal management strategy.

Building on the success of 2021's litter trap programme, the team successfully installed litter traps at eight heavily polluted stormwater drains in Sea Point in 2022, in collaboration with the City of Cape Town and Pristine Earth Collective. Team members are now involved in a plethora of vital coastal responsibilities, such as the stabilisation of sand dunes; removing ghost fishing gear; managing stormwater outlets at the beach interface to reduce land-based pollution entering the sea; repairing or removing damaged coastal infrastructure after swell or storm damage; testing ocean water quality; and responding to marine animal strandings.

Personnel-wise, the expansion of the programme to Plettenberg Bay has meant that Shark Spotters now employs more than 60 individuals, of which 95% live in under-resourced communities. In addition, we have provided externally funded internship placements to eight young graduates from previously disadvantaged communities who are working in our education department. Despite significantly rising expenses for the programme, we prioritised staff wages and managed to provide all staff with a CPIX pay rise and annual bonus to assist them in dealing with the global cost of living crisis.

Skills development was a priority in 2022 and we renewed First Aid Level 1 and Advanced Trauma Management qualifications for all our team. All the staff also attended a week-long marine biology course, hosted by the Two Oceans Aquarium, to become more familiar with the underwater world of False Bay. We worked closely with the team from the SOSF Shark Education Centre again this year, who provided a fascinating programme for all the staff with topics covering shark biology and conservation. In turn, Shark Spotters hosted a BRUV research workshop that was open to a range of university students and interested staff. Two members of our team completed the acclaimed Science Communication course at Stellenbosch University between July and September. We also assisted one member of our coastal team to complete his senior high school certificate [Matric] at night school and are extremely proud of the effort he put in and the results he achieved!



Opposite: Our one-of-a-kind environmentally and socially responsible shark exclusion barrier was deployed for 136 days during the spring/summer months, providing a safe bathing area at Fish Hoek beach.

Right: Working together with the Department of Forestry, Fisheries and the Environment and the City of Cape Town, our team have been conducting baseline ecological monitoring in the Helderberg Marine Protected Area in False Bay, using shore angling and beach seine surveys.

The spotters recorded 111 bronze whaler shark sightings at our operating beaches in the past 12 months.



Our education division continues to expand its impact and reach by maximising to their full potential the education courses that we currently offer. Efforts to promote capacity and to create a meaningful platform by engaging various levels of education about our marine environment and shark conservation have been successful, giving us the opportunity to promote environmental awareness and inspire action for change in the blue economy. In 2021 and 2022, countless children and adults experienced at first hand the array of educational offerings at Shark Spotters, and we have increased our public engagement from 3,000 individuals in 2020–2021 to more than 4,800 individuals who participated in our programmes in 2021–2022. The value and impact of the courses we offer remain one of our core priorities and we have been proactive in our programme development to diversify our offerings to accommodate high schools and university groups. We are constantly improving our service delivery to allow flexibility and to create specialised and age-appropriate shark and marine conservation programmes for the community. To date, we have created more than 50 practical educational activities that are used daily to provide a stimulating and fun learning programme.

False Bay has been identified as a priority area for the ecological monitoring of elasmobranchs and our research footprint grew significantly during 2022. We developed our strategic partnerships with SAIAB and ATAP, which enabled us to expand the acoustic array in False Bay to boost the listening power of this vital node.

Through this collaboration we have secured 30 acoustic tags for eagle rays, lesser guitarfish and spotted gully sharks and have already tagged five of each species. Having also secured the SOSF/ATAP 2022 transmitter grant, we have tags for our new project to investigate the spatial ecology of the short-tailed stingray. Dr Alison Kock also received a transmitter grant this year from ATAP, equivalent to 10 acoustic tags, and has committed these to ongoing Shark Spotters tagging projects in False Bay. Our project to assess the key variables that impact the ability of shark spotters to detect sharks in the inshore zone, which is coupled with the testing of a potential automated camera system for shark spotting, has progressed well. While the automated detection system is an ongoing project, the MSc research looking at factors affecting spotting ability will be submitted in February 2023. Our work on bronze whaler sharks was presented at the Shark and Ray Symposium and was published in the journal *Marine and Freshwater Research* in October 2022. The bronze whaler and sevengill PhD theses will be submitted in 2023. The monitoring of abundance, population dynamics and spatial ecology of white sharks in False Bay remains a top priority and we are involved with several localised and national white shark-orientated research projects that aim to come to fruition in 2023.

Our partnerships and networks continue to grow and, as we conduct all this fantastic work throughout False Bay and further afield, we are determined to build on this progress for a successful 2023 in all facets of the organisation.



A humpback whale passing very close to the Fin Island Station provides an excellent view of its blow hole and tubercles. Each of these 'bumps' contains a hair follicle and is extremely sensitive.



JANIE WRAY

THE NORTH COAST CETACEAN SOCIETY

JANIE WRAY

INTRODUCTION

The North Coast Cetacean Society (NCCS) was founded in 2001 and is a non-profit, charitable whale research organisation that for 21 years has been dedicated to studying whales along the northern and central coast of British Columbia, protecting them and educating people about them. Our objective is to better understand the seasonal distribution, abundance and social dynamics of the whale species that occur here, as well as the impacts of vessel strikes and entanglements on them. Marine and land-based surveys help us to identify potential habitats of importance for fin, humpback and orca populations. We use a combination of genetics methodologies and First Nations' traditional ecological knowledge to better understand and monitor the habitat use of whales. The data we collect will inform the development of mitigation measures to reduce both entanglement and vessel strikes, which are significant threats to whales. The NCCS's outreach programme has been developed to encourage community stewardship by sharing the data collected that is relevant to their region.

Whale blow and eDNA samples will provide data for genetic analysis to increase our understanding of the genetic structure of subpopulations of baleen whale species. This will help to improve management, as subpopulations require high levels of genetic diversity if they are to continue their recovery. We recognise that it is important to merge robust scientific research with community outreach in order to have a tangible impact on the protection of habitat for whale species at risk. This combination of the key criteria for this project will, we believe, provide the necessary positive impact.



Above: A family of northern resident orca travels together in Caamano Sound.
 Opposite: A misty morning in the Great Bear Rainforest.

LAND-BASED RESEARCH

During the 2022 field season the NCCS operated two land-based research stations along the central coast (OrcaLab) and north coast (Fin Island Station) of British Columbia. Although the stations are separated by 550 kilometres (340 miles), we scheduled daily systematic scans to occur at the same times at both locations to compare results from May until the end of October. Using these sightings, we mapped the location and described the group size and behaviour of humpback and fin whales, orcas, Dall’s porpoises, harbour seals, elephant seals and Steller’s sea lions in relation to marine vessel traffic.

When possible from land, we collected photo-identification data to enhance our understanding of site fidelity and sociality, as well as population dynamics. By doing this we identified 107 humpback whales, 27 of which were new arrivals in the region.

Collaboration with other whale researchers has enabled us to match photo identifications and from these we have learnt that 57% of the identified humpback whales have known breeding grounds. We don’t, however, know where the remaining 43% breed. Of those with known breeding grounds, 85% migrate to Hawaii and 14% to Mexico. The remaining 1% have been sighted in both Mexico and Hawaii.



Of those with known breeding grounds, 85% migrate to Hawaii and 14% to Mexico.

MARINE SURVEYS

Throughout the 2022 field season we conducted 49 opportunistic marine surveys focused to collect data on orcas and humpback and fin whales. These combined data will help us to estimate abundance, determine site fidelity and identify key habitat. From these surveys we identified 137 humpback whales, 57 of which were only documented during marine surveys. These opportunistic survey efforts were complemented by seven complete systematic line transect surveys through Squally Channel. During line transect surveys we collected data pertaining to all detected vessels and cetaceans, detailing the species (or type of vessel), group composition, location and behaviour where possible.



Above: PhD student Eadin O'Mahony lowers into the ocean an instrument that detects the conductivity and temperature of the water and how this changes with depth. This helps us to understand underwater sound speed for the hydrophones, as well as why some areas may be humpback hotspots.

Opposite: Photographing a diving humpback whale during a marine survey helps to identify it when seen again and to gauge the species' abundance.

RESEARCH BY DRONE

This season we focused particularly on aerial observations and data collection with our drone fleet. Incorporating drones into our routine data collection methods has enabled us to collect invaluable data for many research projects, including non-invasive genetic sampling, conducting aerial focal follows, investigating the pervasiveness of threats like entanglement and ship strike through scar analyses, and investigating behaviour from new perspectives. Over the course of the 2022 field season we were able to conduct more than 200 flights that collected over 49 hours of footage. Of this 49 hours, more than 11 were captured by a drone directly above a whale or group of whales so that the GPS locations from the drone are accurate to the exact location of the whale(s).

FOCAL FOLLOWS

We conducted focal follows opportunistically from land as well as during marine surveys with the goal of focusing our efforts on single whales or groups of whales with the drone directly overhead. The data that we can extract from focal follow flights give insight into the whales' vulnerability to ship strike by considering the proportion of time they are visible and invisible to marine traffic (or how much time they spend just below the surface compared to at the surface). These data also identify potential areas of importance for particular behaviour or feeding strategies.

SCAR ANALYSIS

In trying to understand the pervasiveness of threats to whales, including ship strike and entanglement, we have put considerable effort into investigating the scars on the bodies of live individuals to gain a more robust insight into how often these events are occurring and to what extent they are impacting populations of humpback and fin whales. We hope to expand the baseline scar dataset that we are building in years to come so that we may gain a better understanding of how frequently these conservation threats occur and so that we can track any changes to individuals' health over time.

PACIFIC HYDROPHONE NETWORK

NCCS has taken the lead role in planning, facilitating and implementing the Pacific Hydrophone Network with the mandate to increase and strengthen valuable partnerships and merge diverse layers of experience in the specialised field of acoustic monitoring of whales. We have successfully built and maintained a hydrophone network that enables us to listen and record the acoustic tradition of whales all along the coast. This project generates acoustic data for research, management and stewardship purposes to improve our understanding of the impact of anthropogenic noise on whales and the habitat they



depend on to ensure their long-time recovery and survival. To date we have successfully designed and installed 21 hydrophone stations in remote and key locations, including within the traditional territories of coastal First Nations. As a result of this success, additional First Nation communities are now joining this collaborative project, sharing traditional knowledge and facilitating community engagement in the project. In May 2023 an interactive map and a new website will document acoustically the presence of whales by means of this hydrophone network. Three species were vocally recorded during our 2022 field season: orca and humpback and fin whales.

It is the support of the Save Our Seas Foundation and the dedicated team-work and collaborative spirit of many that have made 2022 such a successful season by strengthening our knowledge base to ensure the continued recovery of whales and their habitat. Thank you for your support.



Below: A group of nine humpback whales bubble-net feeding in front of Fin Island Research Station.
Opposite: This humpback whale was observed side breaching multiple times during a marine survey.





Matthew Parkinson, an instrument technician for ATAP, prepares acoustic receivers and moorings for deployment in the marine environment.



PAUL COWLEY



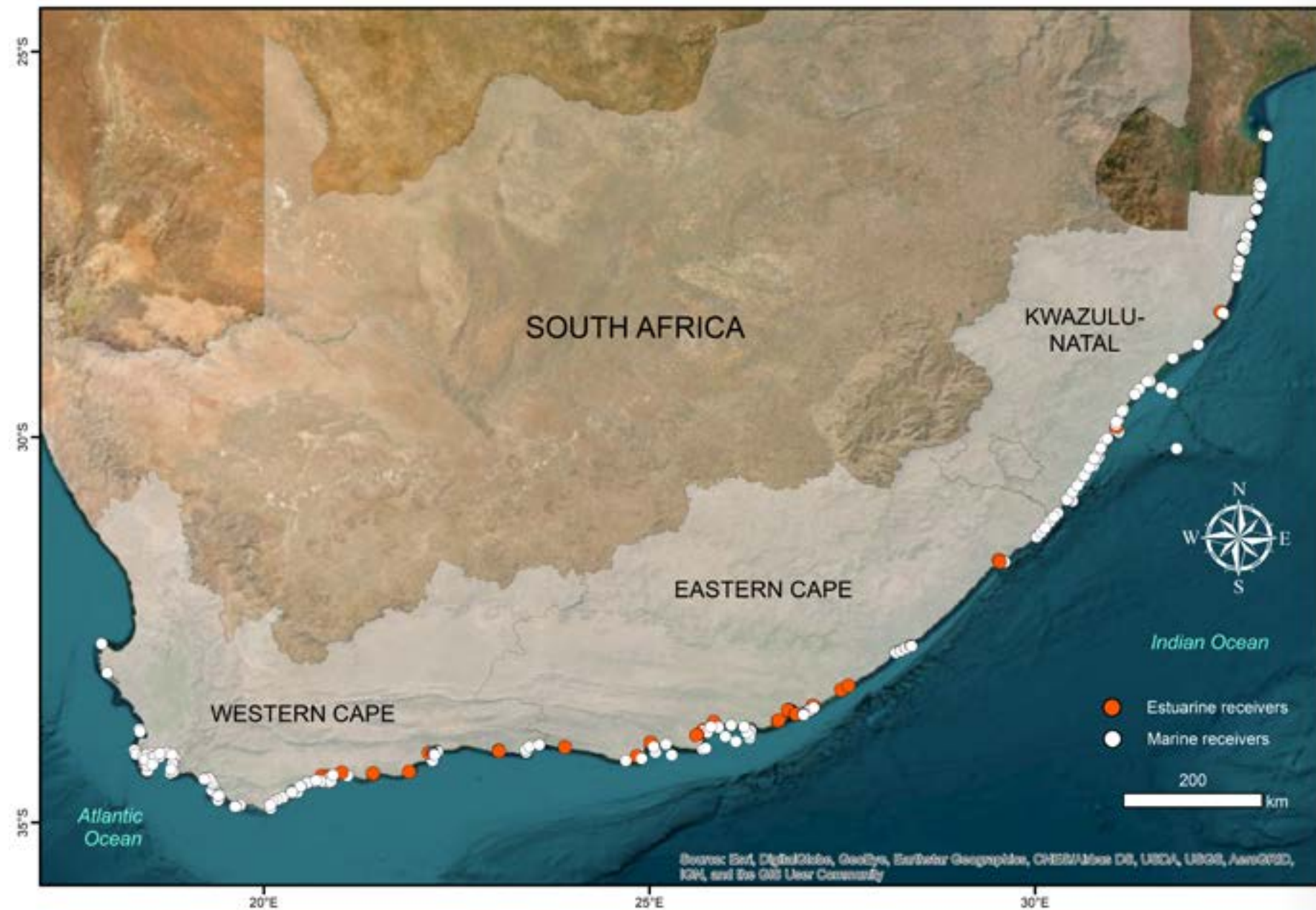
TARYN MURRAY

THE ACOUSTIC TRACKING ARRAY PLATFORM

DR TARYN MURRAY

The Acoustic Tracking Array Platform (ATAP), a research platform managed by the South African Institute for Aquatic Biodiversity (NRF-SAIAB), provides a service to the greater marine science community by collecting and providing long-term data on the large-scale movements and migrations of inshore marine animals that are tagged with acoustic transmitters. Tagged animals are monitored by a network of more than 300 moored acoustic receivers spanning approximately 2,200 kilometres (1,370 miles) of the South African coastline, from St Helena Bay in the Western Cape Province to the South African/Mozambican border, as well as 21 estuaries throughout the region. In addition, the ATAP is in partnership with the Ponta do Ouro Partial Marine Reserve and the Marine Megafauna Foundation, which provides additional listening power in the form of receivers deployed from Ponta do Ouro in the south to Santa Maria in the north of southern Mozambique.

The data downloaded from all receivers are archived in a national database housed at NRF-SAIAB and data reports are issued upon request from researchers (who are generally the tag and data owners). The ATAP is currently collecting data on more than 800 tagged animals, including many sharks and rays with long-life transmitters (up to 10 years).



Opposite: The current ATAP network of passive acoustic receivers extends from the west coast eastwards, providing listening power across approximately 2,200 kilometres (1,370 miles).

Above: A blue stingray swims away after researchers fitted it with a long-life transmitter in the Knysna Estuary, South Africa.

CONSERVATION IMPACT AND REGIONAL SIGNIFICANCE

The ATAP is the only network of its kind on the African continent and sits at an important geographical location at the southern tip of Africa. The coastal waters of South Africa are strongly influenced by two contrasting boundary currents that give rise to three distinct biogeographic regions. Together, these features make South Africa a global biodiversity hotspot with a rich diversity of species and a high degree of endemism. As a result, many of the fish species occurring in southern African waters are targeted by commercial, recreational and small-scale fisheries, providing economic and food security to millions of South Africans. However, this has had, and continues to have, a considerable impact on many marine species.

Management decisions need to be based on improved knowledge of targeted species. It is well known that the distribution and abundance of marine organisms shape the environment in which they live. Consequently, a better

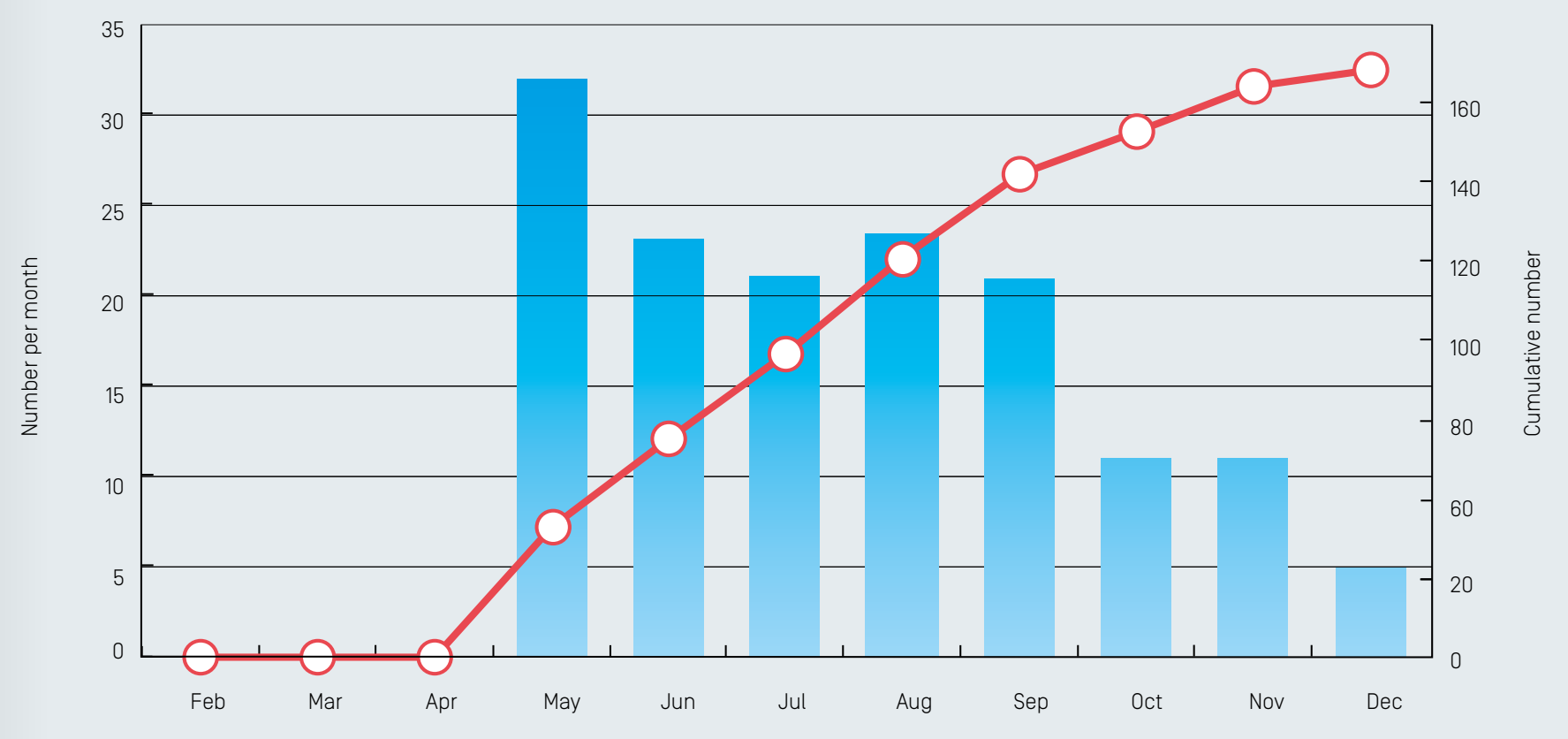
understanding of where, when and why organisms occur in time and space will enable the managing authorities of aquatic environments to improve how they apply an ecosystem-based approach to their task.

Globally, the deployment of acoustic telemetry arrays is yielding unprecedented insights into the spatial ecology of studied animals, which in turn provide convincing data to shape corrective management decisions and policies. The ATAP currently collects data on the movement patterns of 38 species, thereby providing information for spatial management measures (such as marine protected areas) to be applied. These will improve the management and conservation of many threatened animals, ranging from small estuary-associated fishery species to large apex predators such as white sharks. They therefore represent a significant example of the successful implementation of ocean stewardship principles that can contribute directly to sustainable resource management.

MILESTONES
ATAP 10-YEAR REVIEW PUBLISHED

This year marked a decade of the ATAP, highlighting it as a successful ocean stewardship example for Africa. The importance of this research platform was emphasised in a scientific manuscript published in the high-impact journal *Frontiers in Marine Science* in May 2022, titled 'A decade of South Africa's Acoustic Tracking Array Platform: An example of a successful ocean stewardship programme'. To date, this paper has been viewed 1,629 times, 34% more views than all *Frontiers* articles, and has been downloaded 148 times.

A lesser guitarfish resting in the Ulikraals Estuary, South Africa.



The number of downloads per month and the cumulative number of downloads of the ATAP's 10-year review paper, published in *Frontiers in Marine Science* in May 2022.

DATA CONTRIBUTED TO A SYSTEMATIC CONSERVATION PLAN FOR ELASMOBRANCHS

South Africa is a global hotspot for shark and ray diversity, with 193 species or 20% of all sharks occurring in its waters. It also ranks in the top five countries globally in terms of species diversity and many of the species are endemic, or found nowhere else in the world. Data collected by the ATAP were incorporated into a systematic conservation plan for sharks and rays in South Africa, an initiative driven by WILDOCEANS. This plan aims to improve the protection of the country's shark and ray species that are listed as threatened (Vulnerable, Endangered and Critically Endangered) on the IUCN Red List, prioritising those that are endemic. Data

from 23 species, comprising 18 sharks and five stingrays (studied by 11 researchers from nine different organisations), were included in the species distribution modelling phase of the systematic conservation plan. The plan's main outcome was to identify candidate sites for area-based management of threatened and endemic chondrichthyans. These sites can then be put forward as needing increased protection. This report has also been submitted as a scientific manuscript to *Biological Conservation* with the title 'A systematic conservation plan to identify critical areas for improved chondrichthyan protection in South Africa'. The release of the systematic conservation plan roughly coincided with the publishing of South Africa's National Plan of Action for the Conservation and Management of Sharks.

Fifteen blue stingrays, a South African endemic, have been tagged at an aggregation site in the Knysna Estuary, South Africa. Right, Kyle Smith of South African National Parks tries to scoop up an unsuspecting stingray, while opposite, Matthew Parkinson surgically implants an acoustic transmitter into a blue stingray.

SUMMARY OF ACTIVITIES

NEW PROJECTS

Two new elasmobranch projects were launched in 2022. The first is a large-scale multi-collaborative project in False Bay, Western Cape, whose targeted species are spotted gully shark *Triakis megalopterus*, lesser guitarfish *Acroteriobatus annulatus* and common eagle ray *Myliobatis aquila*. This project is in collaboration with Shark Spotters and Two Oceans Aquarium. The targeted species were selected because they are on display in the aquarium and thus provide a perfect platform for education campaigns, both ongoing and new. Matching animals (in terms of both species and number tagged) will be tagged in Algoa Bay, Eastern Cape, in January 2023, providing an excellent opportunity to assess differences in each species' movements between the two bays, as well as the animals' relative connectivity along the South African coastline (which will be detected by the ATAP receiver network). To date, 15 animals (five per species) have been tagged in False Bay and the remaining 45 will be tagged in 2023.

The second elasmobranch study launched in October 2022 involves the endemic blue stingray and the Knysna Estuary, Western Cape. This estuary is currently the only known aggregation site of blue stingrays *Dasyatis chrysonota* and it has been suggested that this aggregation may be for pupping and/or mating purposes. The extent to which these stingrays use estuaries in South Africa is unknown. More specifically, we do not know the purpose and characterisation of this aggregation in the Knysna Estuary. To date, 15 blue stingrays (10 females and five males) have been tagged with long-life acoustic transmitters, with the aim of monitoring their movements for at least three years (and thus monitoring the aggregation for three years). In addition, the stingrays' behaviour is being monitored by direct observation, particularly during the aggregation period, where behaviour will be classed according to the activity, such as resting in a group, resting alone, travelling in a group, travelling alone. Ultimately, understanding the movement and behaviour of blue stingrays at this aggregation site will allow us to gain a better understanding of this apparently unique phenomenon and to determine what potential conservation and/or management benefits it may offer.



The ATAP is currently collecting data on more than 800 tagged animals, including many sharks and rays with long-life transmitters (up to 10 years).



TRANSMITTER GRANT 2022 RECIPIENT

The Save Our Seas Foundation very kindly provided funding for a transmitter grant, which was applied for via an open call; this is the sixth year we've been able to offer this grant competitively. Four applications were received on projects ranging from tagging Critically Endangered soupfin sharks *Galeorhinus galeus* along the southern coast of South Africa to understanding the movements of several elasmobranch species in southern Namibia (which unfortunately falls out of the ATAP network). The 2022 grant was awarded to Toby Rogers of Shark Spotters, whose work aims to investigate the population connectivity, coastal movements and site use of the short-tail stingray *Bathytoshia brevicaudata*, a large marine stingray. This species will be added to those already being tagged as part of the False Bay elasmobranch project and is also conveniently a species on display at the Two Oceans Aquarium.

SAIAB SUMMER SCHOOL IS A GO!

After a two-year hiatus, we were finally able to host our SAIAB Summer School again, held in Port Alfred, Eastern Cape, from 5 to 8 December 2022. This school followed those of previous years, during which 10 undergraduate and postgraduate students from around the country were selected (via competitive application) to attend, with all costs involved being covered by SAIAB. This short but intense school gave the students an opportunity to learn about acoustic telemetry (through the ATAP) and baited remote underwater stereo-video systems (through another SAIAB platform, the Marine Remote Imagery Platform, MARIP). For the acoustic telemetry component, the students got their hands dirty pulling seine nets all day in an attempt to catch mullet big enough to tag – all part of an actual PhD study currently on the go.

ACKNOWLEDGEMENTS

The ATAP's acoustic telemetry hardware has been secured from the Ocean Tracking Network, the National Research Foundation capital equipment grants and the Shallow Marine and Coastal Research Infrastructure. Running expenses and costs linked to servicing the hardware are provided by the Save Our Seas Foundation and the African Coelacanth Ecosystem Programme. Collectively, the support from these organisations has enabled us to establish and run successfully a significant marine science platform that has gained an international reputation. We are extremely grateful to all our funders.

OUR 2022 PROJECT LEADERS

SMALL GRANT PROJECTS

- 1 ALFONSO GONZÁLEZ | MEXICO
- 2 ALGHOZALI | INDONESIA
- 3 BORTOLUZZI | IRELAND
- 4 CAVE | USA
- 5 CHAPUIS | AUSTRALIA
- 6 CONCHA | CHILE & ARGENTINA
- 7 CRISTIANI | ARGENTINA
- 8 DE LA HOZ SCHILLING | MAURITANIA
- 9 GARCÍA-RODRÍGUEZ | MEXICO
- 10 GONZALEZ | PANAMA
- 11 GUIRY | USA
- 12 HERRERA | COLOMBIA
- 13 HOLST | USA
- 14 HOSSAIN | BANGLADESH
- 15 HUERTA BELTRAN | MEXICO
- 16 JIMÉNEZ-PÉREZ | MEXICO
- 17 KELLER | THE BAHAMAS
- 18 LUBITZ | AUSTRALIA
- 19 MAHAN | AUSTRALIA
- 20 NEVES | PORTUGAL
- 21 OLAPIDO | NIGERIA
- 22 SIMEON | SOUTH AFRICA
- 23 TRIPP-VALDEZ | MEXICO
- 24 WAKHIDA | INDONESIA

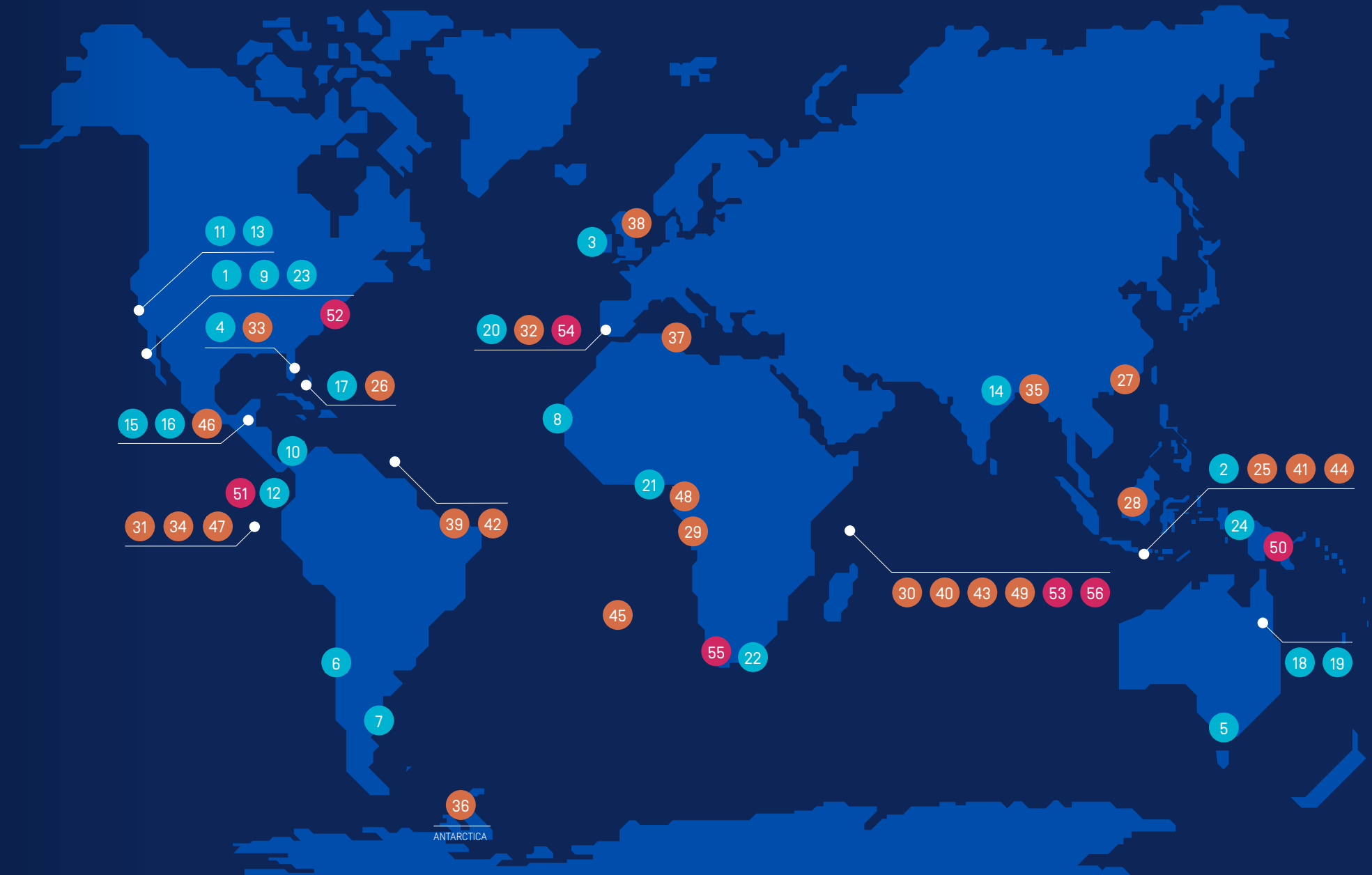
KEYSTONE PROJECTS | CONTINUATION

- 25 BOOTH | INDONESIA
- 26 BRITTAIN | BAHAMAS
- 27 CHAPMAN | HONG KONG
- 28 CHIN | BORNEO
- 29 DOHERTY | REPUBLIC OF CONGO
- 30 DOWNING | SEYCHELLES
- 31 ESPINOZA | GALÁPAGOS
- 32 GRAÇA ARANHA | PORTUGAL
- 33 GRAHAM | WORLDWIDE
- 34 GREEN | GALÁPAGOS
- 35 HAQUE | BANGLADESH
- 36 HART | ANTARCTICA
- 37 HOOD | NORTH AFRICA AND THE EASTERN MEDITERRANEAN
- 38 JONES | SCOTLAND
- 39 KINGON | TRINIDAD
- 40 KISZKA | SEYCHELLES
- 41 KYNE | INDONESIA
- 42 MACDONALD | SAINT VINCENT AND THE GRENADINES
- 43 MORTIMER | SEYCHELLES
- 44 PUTRA | INDONESIA
- 45 QUEIROZ | SAINT HELENA
- 46 RUBIO | MEXICO

- 47 SALINAS DE LEÓN | GALÁPAGOS
- 48 TAKOUKAM KAMLA | CAMEROON
- 49 VEL | SEYCHELLES

KEYSTONE PROJECTS | NEW

- 50 AMEPOU | PAPUA NEW GUINEA
- 51 BESSUDO | COLOMBIA
- 52 CROCKETT | USA
- 53 FASSBENDER | SEYCHELLES
- 54 FONTES | PORTUGAL
- 55 FOSTER & LANDSCHOFF | SOUTH AFRICA
- 56 NEWSOME | SEYCHELLES



PROJECT LEADERS
SMALL GRANT PROJECTS



MASSIEL ALFONSO GONZÁLEZ



CALIFORNIA'S CRYPTIC ANGELS

Universidad Nacional Autonoma de México

MEXICO | PACIFIC ANGEL SHARK

Massiel is something of a squatinid sleuth, aiming to decipher whether the north-eastern Pacific's only angel shark species, the Pacific angel shark, has a cryptic, endemic (found nowhere else in the world) counterpart in the Gulf of California. Using mitochondrial DNA and genetic analyses, Massiel hopes to look at differences in Pacific angel sharks from the Gulf of California and from the west coast of Baja California, and to examine the genetic structure of the population within the gulf. Doing so is key to understanding whether special management is required, especially since the long-lived, slow-growing Squatinidae (angel sharks) are vulnerable to overfishing and extinction.



FAQIH ALGHOZALI

KARIMUNJAWA – THE LAST HOPE FOR JAVA'S GIANTS?

Elasmobranch Project Indonesia

INDONESIA | GIANT GUITARFISH

Faqih is filling the gaps in the scant knowledge about giant guitarfish in Java's Karimunjawa National Park marine protected area. Karimunjawa is located near Northern Java's main fishing grounds, but evidence of giant guitarfish caught in some of the use-zones of the protected area hints that the park may be a sanctuary for the species. Managing giant guitarfish in Karimunjawa requires species-specific information. Faqih's project is a socio-ecological one to help inform management and it draws on new information about relative abundance and distribution, historical occurrence and fishing pressures to paint a contemporary picture of the species in the park.



JENNY BORTOLUZZI

BABY BLUES? FEMALE BLUE SHARKS IN IRISH WATERS

Trinity College Dublin

IRELAND | BLUE SHARK

With a population that has declined by 70% in the Atlantic Ocean, the highly fished blue shark is Jenny's key focus. Her project aims to understand whether the female blue sharks that spend their summers in Irish waters are reproductively mature and how their reproductive status changes during their time in the region. The information from this project will help guide responsible handling practices for local fishers, but can also be scaled up to inform regional and global policies.



ELOISE CAVE



COPING WITH CLIMATE: IS IT IN THE GENES?

Florida Institute of Technology

USA | SHARKS

Our changing global climate is bound to impact the ocean's top predators, but how do we know what the outcome will be for sharks? Eloise is keen to zoom into understanding the genetic diversity of four understudied shark species to answer this question. She is studying the genes associated with the immune system of the sharks and assessing how they are linked to shark survival in different environments. The information from this project and an understanding of how sharks adapt to their changing environment should help the future managing of important ocean ecosystems.



LUCILLE CHAPUIS

THE GHOST OF OCEANS FUTURE

La Trobe University

AUSTRALIA | AUSTRALIAN GHOST SHARK

As evidence increases to show how noisy oceans are having an impact on marine mammals, studies are expanding to explore how other species are coping – or not. Lucille wants to understand how the Australian ghost shark – a deep-sea species accustomed to low light that relies on its hearing to feed and navigate – is affected. She will describe ghost shark hearing using 3D bio-imaging techniques and predict their hearing abilities. Not only will she be describing their hearing system, but Lucille will also test the how the noises from human activities impact these sharks to understand how we may be changing their behaviour.



FRANCISCO CONCHA



THE ELEPHANT IN THE ROOM: ARE TWO POPULATIONS ACTUALLY ONE?

Universidad de Valparaíso

CHILE & ARGENTINA | CHIMAERAS

Francisco is using molecular genetic markers to assess if the American elephant fish that is found in both the Atlantic and the Pacific oceans is one population or two. Basic information about this species is lacking, and its proper future management relies on filling these knowledge gaps. American elephant fish populations are declining, despite increases in landings in Argentina. By finding out whether American elephant fish in the Atlantic and Pacific are the same species – and the same population – Francisco hopes to shed light on population structure and genetic connectivity. In this way, this project will help to inform better conservation management.



FRANCO CRISTIANI

FORECASTING THE FUTURE: POLLUTION AND SHARKS

Centro Nacional Patagónico

Centro para el Estudio del Sistemas Marinos

ARGENTINA | CHIMAERAS

Harmful pollutants in the ocean can disrupt the reproductive capacity of many species. That the future of sharks hangs in the chemical balance is a devastating thought – and it's a scenario that Franco is trying to understand so that we have a better chance of mitigating it. He believes that the impact of marine pollutants is probably greater than we already recognise, but a lack of research mutes its real importance to us. By using the American elephant fish as a case study and assessing its reproductive health in polluted waters, this project hopes to set a baseline for future monitoring of ocean health.



CAROLINA DE LA HOZ SCHILLING



TAXONOMY AND PHYLOGENY OF SHARKS AND RAYS IN MAURITANIA

Parc National du Banc d'Arguin

MAURITANIA | RAYS & SKATES, SHARKS

Banc d'Arguin, a shallow bay in Mauritania's National Parc du Banc d'Arguin, is home to many vulnerable shark species. As many as two-thirds of these are threatened with extinction. A law passed in 2000 granted exclusive fishing rights in the bay to the indigenous Imraguen fishers. Despite a further ban on shark and ray fishing, as much as 50% of the Imraguen fishers' catches are still elasmobranchs. Carolina is assessing shark and ray diversity in the bay, improving data collected by local fishers through identification training and raising awareness among the local community about the plight of elasmobranchs.



EMILIANO GARCÍA-RODRÍGUEZ



KELP! IMPORTANT OCEAN FORESTS FOR SHARKS

Centro de Investigación Científica y de Educación Superior de Ensenada

MEXICO | SHARKS

Emiliano wants to assess the importance of kelp forest ecosystems to sharks and is using San Quintin Bay in Baja California, to understand their value. He aims to show how changes in kelp forest communities might impact sharks under future climate scenarios. Using horn sharks and banded guitarfish as model species, Emiliano is analysing where sharks sit in the kelp forest food pyramid. He is also estimating the diversity and abundance of shark species and hopes to show how a changing community structure in kelp forests as a result of climate change could affect sharks and rays.



CINDY GONZALEZ

BONNETHEAD SHARK

Florida International University

MEXICO | SHARKS

Cindy wants to know if bonnethead sharks in the Eastern Pacific constitute a third, cryptic species. The bonnethead complex needs clarification in all its distribution range, and Panama is a key country to solve this question since it is bordered by the Caribbean Sea and the Pacific Ocean. By taking fin clip samples to evaluate species at the genetic level and collecting specimens to compare how they look (morphology), Cindy hopes to resolve the taxonomy of *Sphyrna tiburo vespertina* – that is, whether it's a cryptic third species for bonnetheads in the region. Her information can help update the IUCN Red List for bonnetheads and improve fisheries policies in Latin America, where bonnethead sharks are commonly caught.



ERIC GUIRY

CLUES FROM THE PAST TO GUIDE THE FUTURE

School of Archaeology and Ancient History University of Leicester

USA | SHARKS

Eric is casting back in time to understand how processes throughout history have shaped shark ecology today. Based in Monterey Bay, where declines in the 21 different local shark species have been attributed to overfishing and environmental change, he is using archaeological sites to understand thousands of years of shark history. Using ancient DNA to confirm species identification for shark remains, and combining this with cutting-edge biogeochemistry, Eric aims to look at how overfishing and habitat change have impacted shark behaviour over a much greater timescale than ever before. His hope is that his results will add nuance to how shark conservation is approached.



MARIA ALEJANDRA HERRERA

HOME SWEET HOME FOR COLOMBIAN HAMMERHEADS

SOSF Shark Research Center

COLOMBIA | HAMMERHEAD SHARKS

Maria wants to help identify good areas to establish no-take zones for marine protected areas (MPAs) to protect hammerhead species. Her project focuses on scoophead and scalloped bonnethead sharks, and scalloped hammerhead sharks, which co-occur on Colombia's Pacific coast. By looking at the variability in the type of habitats that these sharks are selecting, Maria hopes to be able to identify the best places to locate effective no-take (no fishing) zones. Her project is working towards this goal and, together with local fishers and communities, to reduce bycatch of these sharks in artisanal fisheries.





MEGHAN HOLST



SEVENGILL SHARKS IN SAN FRANCISCO BAY

Aquarium of the Bay, University of California Davis

USA | SEVENGILL SHARKS

Meghan wants to know all about sevengills in San Francisco Bay: what they’re eating at different ages and life stages, where they’re spending their time, and whether they are stressed by handling in the recreational catch-and-release fishery. Answering these questions will help her inform their ability to survive and thrive after being handled, whether there are any threats to their particular dietary needs at vulnerable stages in their life, and what the ecosystem that they most need looks like. Ultimately, this project will help inform fisheries management and hopefully better protect sevengill sharks on the Eastern Pacific coastline.



NAZIA HOSSAIN

HAMMERHEADS OF THE BAY OF BENGAL

Department of Zoology, University of Dhaka

BANGLADESH | HAMMERHEAD SHARKS

Nazia is set on establishing a solid scientific basis for the adequate conservation of Bangladesh’s hammerhead sharks. To do so, her project is adopting a sustainable fisheries approach to achieve several aims: identify threats to hammerheads from fishing and international trade; assess the extinction risk of the species in the region; and understand the overall biological, management and socio-ecological risk in order to draw up a conservation plan. Nazia will be investigating trade routes, fishing grounds and essential shark habitats, as well as assessing fishers’ perceptions and understanding fishing pressure in the Bay of Bengal.



BRYAN HUERTA BELTRAN

GUITARFISH IN MEXICO’S MEDICINAL MARKETS

University of Southern Mississippi

MEXICO | GUITARFISH

Bryan is on a mission to know which guitarfish are marked as ‘pez diablo’. These are guitarfish species that are caught, cut and modified to have a ‘devil-like’ appearance to be sold in Mexico’s curio and medicinal markets. Of the nine species of this highly endangered group of shark-like rays in the world, eight are found in Mexico. Using a combination of methods, Bryan will investigate which species are being sold in this way and will create infographics to educate people about Mexico’s eight guitarfish species.



ALEXIS JIMÉNEZ-PÉREZ

SHEDDING LIGHT: ASSESSING LAMP TO IDENTIFY SHARKS IN MEXICO’S TRADE

Centro Interdisciplinario de Ciencias Marinas

MEXICO | SHARKS

Alexis is keen to close the knowledge gap and assess the best method to identify shark products sold as fillets in Mexico. Focusing on Mexico’s most-fished species, Alexis hopes to test a method that is based on DNA and proteins called loop-mediated isothermal amplification (LAMP). And why has he chosen LAMP? Understood to be quick and efficient, it is also inexpensive. Economical identification of which shark species are being traded as fillets would help to better inform fisheries management and therefore assist in the making of decisions about the use of sharks as a marine resource in Mexico.





BRYAN KELLER
NOT JUST A FAD: PROTECTING SILKY SHARKS IN FISHING HOTSPOTS

Saving The Blue
THE BAHAMAS | SILKY SHARKS\$

Fish aggregating devices (or FADs) are used by tuna fishers globally to attract shoals of their target species. Unfortunately, highly threatened and social silky sharks also form large aggregations – often near these floating attractions in the ocean. Bryan wants to know what’s driving these aggregations to form near FADs. He hopes that by uncovering this information, this project will help inform fisheries managers on suitable ways to mitigate silky sharks being killed near FADs when they are caught as tuna bycatch.



NICOLAS LUBITZ
COMING HOME: MOVEMENT PATTERNS OF AUSTRALIA'S BULL SHARKS

James Cook University
AUSTRALIA | BULL SHARK

Nicolas is concerned about Australia’s bull shark nurseries: the coastal bays and rivers where these sharks go to pup. Evidence has shown that female bull sharks may return to the same nurseries where they were born to give birth to their own pups and that they repeat this pattern each reproductive cycle. If this is true, there is concern that bull shark population connectivity and recovery would be limited if these rivers and bays were to be degraded. Nicolas’s project will use genetics and acoustic telemetry to assess how natal philopatry (the tendency to return to the same nursery each cycle) shapes female bull sharks’ movements along Australia’s eastern coastline.



BRANDON MAHAN
FOREVER YOUNG: NEW WAYS TO AGE SHARKS

James Cook University
AUSTRALIA | SHARKS

Brandon is applying novel and state-of-the-art techniques to assess the age of sharks and determine their migratory patterns. Knowing how sharks age is critical to properly managing their populations in fisheries, ensuring that their harvest is sustainable and that they can recover. In fish science, researchers use the ear bones, called otoliths, to count growth rings laid down over time. In sharks, growth rings in the vertebrae have traditionally been used. However, there are accuracy issues with this technique. This project aims to refine this process to make sure the way we age sharks is more accurate and thus to better inform their management.



FABIANA NEVES
GOING VIRAL: UNDERSTANDING VIRAL RNA DIVERSITY IN SHARKS

CIBIO – Centro de Investigação em Biodiversidade e Recursos Genéticos
PORTUGAL | CHIMAERAS, RAYS & SKATES, SHARKS

Populations of sharks and their cousins – the rays, skates and chimaeras we call chondrichthyans – have suffered declines as a result of overfishing, habitat degradation and pollution, and will continue to do so as our climate changes. But what about sharks that get sick? Fabiana is investigating the most prevalent kind of viral infection in chondrichthyans: RNA viruses. The other threats that have driven sharks into decline may also affect their genetic diversity and resilience, so understanding the diversity of viruses that infect them could help us understand even more about shark immune systems.





SEGUN OLADIPO

PINPOINTING NEW INFORMATION FOR NIGERIA'S PINCUSHION RAY

Kwara State University, Nigeria

NIGERIA | PINCUSHION RAY

Segun is gathering the first data for the pin-cushion ray, one of only two freshwater stingrays in Africa. By establishing and training the first Nigerian Stingray Conservation Team (NSCT) to collect citizen science fishery data, surveying the distribution and threats of this stingray, and driving awareness campaigns with communities, Segun's project will bring new understanding for a little-known species. Increasing what is known about the ecology and conservation status of this freshwater ray can help drive suitable conservation policies in Nigeria and identify the habitats that most need protection.



ANNA SIMEON

A NEW WAY TO FIND WHITE SHARK NUMBERS

School of Aquatic and Fishery Sciences, University of Washington

SOUTH AFRICA | WHITE SHARK

Anna is collecting genetic information from white shark fin clips to assess this species' population size in South Africa. Using close-kin mark-recapture analysis instead of traditional methods, she hopes to provide an accurate account of South Africa's white shark population size. She also aims to develop a monitoring protocol that can use genetic samples collected during shark net and drumline patrols by the KwaZulu-Natal Sharks Board. This information is needed in South Africa, where the conservation of a protected species is balanced against concerns about bather safety, and where sharks are caught in bather protection gear.



MIGUEL TRIPP-VALDEZ



GUT FEELING: THE IMPACT OF HEAVY METALS ON SHARK MICROBIOMES

Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California

MEXICO | SHARKS AND RAYS

A healthy microbiome is key to fitness in sharks and rays, but increasing amounts of heavy metals in the ocean could disrupt these microbes and impact shark and ray immune systems. Miguel wants to understand shark microbiomes because impaired immunity will make already threatened sharks and rays more susceptible to environmental stress. His project will sample gut microbes from smooth hammerheads and giant electric rays in the Gulf of California, Mexico. By describing the microbiome in these sharks and rays from both polluted and unpolluted sites, Miguel hopes to understand if heavy metals lower microbial diversity.



YUNITA WAKHIDA

SEARCHING FOR SAWFISH IN INDONESIAN SEAS

Sawfish Indonesia

INDONESIA | SAWFISH

Yunita is in search of sawfish in Asmat Regency, in the Papuan provinces of Indonesia. Her project will describe the current presence, distribution and diversity of sawfish species in the region. She will also be investigating the cultural and socio-economic value of sawfish for the people of Asmat Regency. For rays that have largely disappeared from Indonesian waters elsewhere, this project can provide the Indonesian government with baseline information that will help to bring sawfish into a national conservation strategy.



PROJECT LEADERS
KEYSTONE PROJECTS | CONTINUATION



HOLLIE BOOTH
SOLUTIONS FOR SHARK FISHERIES IN A SURFERS' PARADISE

University of Oxford
INDONESIA | RAYS & SKATES, SHARKS

Hollie is investigating how marine tourism can contribute to conservation in the global diving treasure that is Indonesia. Nestled in the heart of the 'Coral Triangle', Indonesia is an archipelago of contrasts: it is both a global biodiversity hotspot and the world's largest shark-fishing nation. By focusing on the tourism hotspots of Kuta and and the fishing communities of Tanjung Luar and Aceh Jaya, Hollie is searching for ways to reduce the threats facing sharks in fisheries.



CANDICE BRITTAIN
BUILDING FUTURE CONSERVATION LEADERS IN THE BAHAMAS

Cape Eleuthera Institute
BAHAMAS

Building a generation of critical thinkers and fostering a sense of connection are what Candice's work at the Cape Eleuthera Island School in The Bahamas is all about. By challenging children to seek out the answers to their questions themselves and enabling them to visit important marine ecosystems, Candice is encouraging new advocates for the environment and empowering them to make changes in their world.



DEMIAN CHAPMAN



RAPID DNA TESTING GIVES HOPE FOR 'RHINO RAYS' IN HONG KONG

Mote Marine Laboratory
HONG KONG | RAYS & SKATES

Demian's team is developing tools that help border control officers identify illegal shark products. His project is sifting through 'rhino ray' DNA sequences looking for differences in code between the guitarfishes, giant guitarfishes and wedgefishes, nicknamed for their pointy snouts (and Endangered status). Months of testing will help ensure that only rhino ray DNA is targeted before the team flies to Hong Kong to help officials use a portable DNA tester. This project will add to the arsenal currently being employed to identify illegal shark fins moving across borders and will help stop the trafficking of 'rhino ray' fins.



ANDREW CHIN
SEARCHING FOR THE RIVER SHARKS AND RAYS OF BORNEO

James Cook University
BORNEO | RAYS & SKATES, SHARKS

Andrew and field researcher Michael Grant will be scouring rivers, local fish markets and landing sites to increase scientific attention on the threatened river sharks and rays of Borneo. Before they go searching for sharks, his team are starting with people: developing relationships with local collaborating Hasanuddin University, and contacting fisheries officers and fishers to collate information on sightings and record data. Their expedition will catch, measure and sample river sharks, as well as record environmental data to assess what habitats these animals prefer. In so doing, this collaborative team will shed new light on this biodiversity hotspot near the heart of the 'Coral Triangle'.





PHIL DOHERTY

PROTECTING THE THREATENED SHARKS AND RAYS OF THE REPUBLIC OF CONGO

University of Exeter

REPUBLIC OF CONGO | RAYS & SKATES, SHARKS

Phil is trying to understand the artisanal fishery of the Republic of Congo. He works in the Gulf of Guinea off the coast of Central and West Africa, a productive area with high levels of biodiversity and many sharks and rays. He works closely with local researchers, NGOs and fishers to collect information needed from landing sites and to equip local researchers and authorities with skills in species identification, field data collection and management. He hopes to understand the catch composition and glean information about species such as wedgefishes and giant guitarfishes that may well be found here.



NIGEL DOWNING



HOLDING ONTO HOPE: LONG-TERM CORAL REEF MONITORING IN SOUTHERN SEYCHELLES

Aldabra Marine Programme

SEYCHELLES | CORALS

Nigel is forging ahead with what he hopes may become a 23-year-long survey of the recovery of Seychelles' southernmost reefs. In 1999, he established the Aldabra Marine Programme (AMP) and studied the reefs until 2008, tracking their recovery after a strong coral bleaching event in 1998. Now, after a 13-year-long hiatus, he is covering survey sites between four key islands and reef systems: Aldabra, Assumption, Astove and St Pierre. Divers use videos to record the corals and seafloor condition or survey fish species that are recorded in a database for analysis.



EDUARDO ESPINOZA

CONSERVATION STRATEGIES FOR HAMMERHEAD SHARK NURSERIES IN THE GALÁPAGOS MARINE RESERVE

Galápagos National Park Service

GALÁPAGOS | SHARKS

Scalloped hammerhead sharks are listed as Critically Endangered on the IUCN Red List, the barometer of threat for global biodiversity. Hammerheads are generally some of the ocean's most threatened species and often journey great distances where they come into contact with fisheries, so protecting them where they aggregate is a vital conservation strategy. Potential scalloped hammerhead nursery grounds have been identified in the Galápagos Marine Reserve, a UNESCO World Heritage Site. Eduardo focuses on describing these sites to help promote their increased protection and generate a conservation strategy for these essential habitats.



SOFIA GRAÇA ARANHA

CAN DEEP-SEA SHARKS SURVIVE – AND THRIVE – IN FISHING GROUNDS?

The Portuguese Institute for Sea and Atmosphere, University of Algarve & University of Porto

PORTUGAL | RAYS & SKATES, SHARKS

Sofia is driven by a passion for deep-sea sharks and aims to produce a fish-handling protocol for deep-sea fishermen in Portugal's southern Mediterranean and Atlantic waters. She developed the DELASMOP project to assess the condition and survival of elasmobranchs caught in fisheries in the north-eastern Atlantic. Sofia collects vital information about the fishing vessels while aboard deep-sea crustacean trawlers and also samples the sharks brought in as bycatch. She tags them before release to gauge their survival rates, and collects tissue samples to understand their diet and assess if there's overlap between shark feeding grounds and fishing areas.





JASMIN GRAHAM



GILL GUARDIANS: AN ELASMOBRANCH CONSERVATION AND EDUCATION HUB

Minorities in Shark Sciences

WORLDWIDE | SHARKS

Jasmin and her team create content to teach the general public about elasmobranchs (sharks, skates and rays), the threats they face and current conservation efforts to protect them. Gill Guardians is a freely available online hub that connects people globally to engage with elasmobranch science and conservation. They offer video lessons, activities and quizzes. They also host live virtual seminars to bridge the gap between scientists and the public and to grow a new generation of conservation-minded shark advocates.



JONATHAN GREEN

SECRETS OF THE WHALE SHARKS OF THE GALÁPAGOS MARINE RESERVE

GALÁPAGOS | WHALE SHARKS

Jonathan is tracking whale shark movement patterns using different satellite tags to understand where they are moving in and around the Galápagos Marine Reserve. To what depths are they diving? How do they use different habitats? This information is vital to identify key areas for their survival.



ALIFA HAQUE



PROTECTING 'RHINO RAYS' IN THE WORLD'S LARGEST BAY

Department of Zoology, University of Dhaka

BANGLADESH | RAYS & SKATES

Alifa's long-standing project along south-eastern Bangladesh has involved working with fishers and policy-makers to increase their understanding of the importance of 'rhino rays' (guitarfishes, giant guitarfishes and wedgefishes). She has gained ecological knowledge from local fishers and her own surveys, which she hopes will help her identify the key habitats of rhino rays around Bangladesh. After expanding her work to south-western Bangladesh, and having focused on sawfish conservation for many years, Alifa understands that declines in sawfish may point to similar concerns for rhino rays. This is propelling her towards establishing an education programme for the conservation of sawfish and rhino rays in Bangladesh.



TOM HART

DISENTANGLING THE DRIVERS OF ANTARCTIC PENINSULA PENGUIN COLONY DECLINES

University of Oxford

ANTARCTICA | BIRDS

Tom has a once-in-a-lifetime opportunity to tease apart the impacts of human visitation, climate change and fishing on Adélie, gentoo and chinstrap penguins. Using drone footage, camera data and faecal samples collected in 2020/21 and into 2022, he's monitoring Antarctica in years with minimal human footprint due to the Covid-19 pandemic. Tom wants to know whether rising sea temperatures, increasing krill fishing or a growing tourism presence is driving declines of Antarctic Peninsula penguins. By comparing 10 years' of monitoring data to these data, he hopes to use his findings to inform policy decisions to conserve the Antarctic Peninsula's penguin colonies.



ALI HOOD

MEDITERRANEAN GUITARFISHES: ADDRESSING FISHERIES PRESSURE AND MARKET DEMAND

The Shark Trust

NORTH AFRICA AND THE EASTERN MEDITERRANEAN
RAYS & SKATES

Ali is collaborating with researchers across North Africa and the Eastern Mediterranean to develop support tools for guitarfish conservation. As an advocate, much of her work is completed behind a computer and locked in meetings, but her goal is to help bring awareness to the Threatened status of guitarfish in the Mediterranean. As the current director of conservation for the Shark Trust, Ali represents a large number of regional partners to engage with governments, develop new resources and coordinate guitarfish conservation activities.



CATHERINE JONES



A GENETIC TOOL TO HELP MONITOR SHARKS AND SKATES IN THE NORTH-EASTERN ATLANTIC

University of Aberdeen

SCOTLAND | RAYS & SKATES, SHARKS

Catherine is intent on helping better monitor flapper skates and spurdogs in the north-eastern Atlantic. To do so, she is developing a tool that can use DNA from egg cases, skin mucus and historical samples to analyse the diversity, kinship, connectivity and adaptations of these species. She and her team are identifying a subset of the most informative genetic markers for each species, which will help inform conservation strategies and MPA management for both species in Scottish seas.



KELLY KINGON

COMMUNITY-SUPPORTED CONSERVATION GOALS FOR SCALLOPED HAMMERHEAD

University of Trinidad and Tobago

TRINIDAD | SHARKS

Kelly is hoping to identify areas that hammerhead shark pups prefer and possibly use as nurseries so that she can help develop management plans to protect these havens. Young scalloped hammerhead sharks are caught in alarming numbers at certain times of the year off the Caribbean island of Trinidad, where murky waters mean lots of nutrients and abundant marine life. The team will spend their time catching sharks to age, sex, measure and tag them before taking a genetic sample and releasing them.



JEREMY KISZKA

THE IMPORTANCE OF SEYCHELLES FOR BLUE WHALES AND OTHER WHALES AND DOLPHINS

Florida International University

SEYCHELLES | MARINE MAMMALS

Jeremy wants to understand when blue whales and other whales and dolphins visit Seychelles, and how many visit when they do. He investigates which factors, such as ocean currents and noise pollution, affect their presence and behaviour in these waters. To do this, he spends hours observing whales and dolphins from a boat, documenting their behaviour, where they move and what they do. He also uses their calls to determine when they arrive, whether they're feeding or mating, and where they come from. This information can help identify new behaviours and important areas that need protection.



PETER KYNE



THE CLOWN WEDGEFISH: NO LAUGHING MATTER

Charles Darwin University
INDONESIA | SHARKS

Peter credits the recent location of the rare and relatively unknown clown wedgefish to searching social media posts for wedgefish catches. But his focus now is ground-truthing where this species occurs in the wild and what habitat it uses. For this he is engaging with local fishers around the Riau Islands in Indonesia. Using local knowledge and participatory mapping, fishers will guide Peter and his team to where to collect environmental DNA (eDNA), a relatively new and rapidly evolving tool that uses genetic techniques to search for the DNA of the target species – in this case, the clown wedgefish.



JEANNE MORTIMER

COMMUNITY MONITORING OF NESTING SEA TURTLES AT D'ARROS ISLAND AND ST JOSEPH ATOLL, SEYCHELLES

SOSF D'Arros Research Centre
D'ARROS ISLAND AND ST JOSEPH ATOLL, SEYCHELLES | TURTLES

The beaches of D'Arros Island and St Joseph Atoll are very important places for female sea turtles to come ashore and lay their eggs. Jeanne is training Seychellois monitors to observe nesting turtles and collect data about them.



CATHERINE MACDONALD
COMMUNITY CONSERVATION IN THE CARIBBEAN

Rosenstiel School of Marine & Atmospheric Science (RSMAS), University of Miami
SAINT VINCENT AND THE GRENADINES | SHARKS

Shark fishing is becoming increasingly important in Saint Vincent, but little is known about the shark populations there. Catherine is finding out which sharks live there and how they are utilised by local communities. She's working with fishermen to achieve sustainable management of these fisheries.



EEN IRAWAN PUTRA
'RHINO RAY' CONSERVATION IN INDONESIA

Rekam Jejak Alam Nusantara Foundation; University of Aberdeen
INDONESIA | RAYS & SKATES

Een is the executive director of the Rekam Nusantara Foundation in Indonesia, where he works with a variety of partners and stakeholders. His key concern lies in building local support for 'rhino ray' conservation and management in the north Java Sea. Giant guitarfishes and wedgefishes (collectively dubbed rhino rays for their pointed snouts and Endangered status) are some of the most threatened species in the ocean. Through fisheries and marine programmes, Een hopes to continue to work with the Department of Marine Affairs and Fisheries of Central Java, and Diponegoro University, to find urgent solutions.



NUNO QUEIROZ

SATELLITE TRACKING SHORTFIN MAKO SHARKS IN THE SOUTH ATLANTIC

Research Centre in Biodiversity and Genetic Resources

ST HELENA | SHARKS

Nuno and his team are deploying satellite tags in large female mako sharks to track where they move and what they do. The tags have a lifespan of over two years and are deployed in sharks in the South Atlantic during an eight-week commercial longlining fishery operation. The project focuses on the waters off St Helena, a remote volcanic tropical island where large female mako sharks have recently been observed. Nuno is interested in where these sharks move to, what environmental factors influence this and what the consequences are for conservation. His aim is to understand the patterns, causes and consequences of movement using new systems to gather unique insights into free-ranging marine fish behaviour.



NADIA RUBIO

LINKING LOCAL KNOWLEDGE AND LOCAL HEARTS TO SAVE THE SHARKS OF HOLBOX ISLAND

Mar Sustentable Ciencia y Conservacion

MEXICO | SHARKS

Nadia learns about life in the sea from those who spend their lives around the sea. Collecting Local Ecological Knowledge (LEK) about sharks, sawfish, manatees and sea turtles, she connects this information with spatial data to understand Mexico's marine biodiversity. Nadia focuses on Holbox Island off the Yucatan Peninsula in Quintana Roo. The island forms a coastal lagoon surrounded by mangroves (thought to be shark breeding grounds) with its seafloor covered by sea grasses. Holbox is a treasure trove of marine life that Nadia is intent on helping to manage in the wake of rapid development.



PELAYO SALINAS DE LEÓN

PROTECTING THE SHARKIEST PLACE ON EARTH

The Darwin and Wolf Conservation Fund

GALÁPAGOS | SHARKS

Pelayo is on a mission to keep the Galápagos, in his words: 'the sharkiest place on the planet'. Leveraging what he's learned from baseline surveys, and in collaboration with Professor Mahmood Shivji at the Save Our Seas Shark Research Center, his research is now assessing the migratory routes and population genetics of pregnant scalloped hammerhead sharks across the Tropical Eastern Pacific. He is also investigating the movement ecology of female silky sharks in relation to regional fishing fleets around the Galápagos Marine Reserve. Pelayo continues to advise on shark conservation policy in the region and heighten awareness of its rich marine heritage.



ARISTIDE TAKOUKAM KAMLA



COMBINING COMMUNITY AND GENETICS FOR CONSERVATION IN CAMEROON

African Marine Mammal Conservation Organization

CAMEROON | RAYS & SKATES, SHARKS

Aristide created a citizen science platform and mobile app for fishers across Cameroon's 400-kilometre (250-mile) coastline to record sightings of sharks, rays and marine life. These photos are uploaded to iNaturalist where they are identified and will serve to create Cameroon's first elasmobranch atlas. Together with his team, Aristide ensures data are being uploaded, visits fish landing sites to assess bycatch and measure sharks, and checks beaches for strandings and sea turtle nests. He collects tissue samples of threatened species that can give more insights into the diversity, population size and structure of vulnerable sharks.



TERENCE VEL
ENVIRONMENTAL EDUCATION IN SEYCHELLES

University of Seychelles

SEYCHELLES | TERRESTRIAL AND MARINE CONSERVATION

Terence has been running the Wildlife Clubs of Seychelles and working with the Unisey Centre for Environment and Education (UCEE) for many years. He is a long-standing recipient of a Save Our Seas Foundation grant. His work has been to make the wonders of the natural world, and the incredible heritage of Seychelles, available to children and young adults. By allowing children to learn and immerse themselves in nature, Terence hopes to guide them to the best environmental solutions and help older youth on a path to study the natural world at university.

PROJECT LEADERS
 KEYSTONE PROJECTS | NEW



YOLARNIE AMEPOU
KEEPING WATCH ON WINGHEAD SHARKS IN PAPUA NEW GUINEA

PAPUA NEW GUINEA | WINGHEAD SHARK

Yolarnie is working to provide information to bolster fisheries management of the Endangered winghead shark in the Kikori Delta of Papua New Guinea. The significant winghead shark population here is vulnerable to the swim-bladder fishery that has taken root in the turbid waters of the Kikori Delta since 2010. Fish like the scaly jewfish and barramundi are targeted for their swim bladders, but Yolarnie is monitoring the fishing nets because they are a key source of winghead shark mortality. She's hoping her findings will be taken up by the National Fisheries Authority to institute a management plan for swim-bladder fisheries.



SANDRA BESSUDO
DOCUMENTING BIODIVERSITY IN COLOMBIA'S MALPELO MPA

Malpelo and other Marine Ecosystems Foundation

COLOMBIA | BIRDS, MARINE MAMMALS, RAYS & SKATES, SHARKS, TURTLES

Sandra is using multiple methods to characterise the shark communities in Colombia's Malpelo Fauna and Flora Sanctuary. Using a combination of baited remote underwater video systems (BRUVs), underwater visual census (UVC) done on scuba dives, remotely operated vehicle (ROV) dives and tracking information downloaded from acoustic telemetry receivers, she hopes to improve the kind of information available about sharks and rays in this marine protected area in the Colombian Pacific Ocean. Her work will help detail population trends, current threats and species composition in the region. The project will hopefully strengthen research and monitoring at Malpelo.



LEE CROCKETT
SHARK CONSERVATION FUND

Shark Conservation Fund

USA | SHARKS

The Shark Conservation Fund (SCF) distributes grants, aiming to end the global overexploitation of sharks and rays. Using sharks and rays as flagship species, the fund's mission is to protect the health of the oceans by maintaining their function. Four key objectives underpin a strategy to achieve systematic change in shark and ray management:

- Protecting 100 vital shark and ray areas by 2030;
- regulating international trade in sharks and rays;
- protecting the most endangered species;
- combating unsustainable fishing practices.

Through its philanthropic collaborations, the SCF wants to prevent species extinctions, reverse population declines and restore population numbers by means of policy, outreach, advocacy, science and monitoring.





NICO FASSBENDER

THE RIGHT REEFS FOR SHARKS

Marine Futures Lab, University of Western Australia

SEYCHELLES | CORALS, SHARKS

Nico is using acoustic telemetry and BRUVs around Seychelles to explore how reef sharks are using their reef homes. What are they eating? What prey is available? His project aims to explore what factors influence ideal habitats for sharks and will combine information from both pristine and degraded reefs to create a model to test this suitability. The point? To build on work by the Marine Futures Lab across the Indian Ocean and the Indo-Pacific and to help identify priority shark conservation areas.



JORGE FONTES



THE SEA'S SHEEPDOGS: TUNA AND WHALE SHARK FEEDING ASSOCIATIONS IN THE AZORES

Okeanos, University of Azores

PORTUGAL | WHALE SHARKS

In the Azores, slow-moving whale sharks are often found feeding on frenzied bait fish in association with tuna. The speedy tuna are nimble enough to 'herd' the bait fish and the whale sharks rely on this service. In a world where whale shark numbers are declining, places where healthy populations can thrive are critical. But fishers in the Azores also prefer to target these large schools of tuna, putting them in competition with the whale sharks. Using a combination of historical and biologging data, Jorge hopes to understand more about these whale shark and tuna associations and to better inform the conservation measures needed to protect them.



CRAIG FOSTER & JANNES LANDSCHOFF

1001 SEAFOREST SPECIES

Sea Change Project

SOUTH AFRICA | GREAT AFRICAN SEAFOREST

Craig and Jannes are diving into the Great African Seaforest in South Africa to bring to shore 1001 stories of the species that live there. Combining marine biological research with the art of underwater tracking, nature documentary-making and storytelling, the pair from the Sea Change Project hope to build a biodiversity dataset from the region that will grow and ultimately nurture a new appreciation for the fragility and wonder of nature.



RACHEL NEWSOME

ON REEF MANTA TIME AT D'ARROS, SEYCHELLES

Murdoch University

SEYCHELLES | REEF MANTA RAY

Questions of how climate change, human disturbances and habitat alterations might affect how reef manta rays use their coral reef homes can only be answered if we understand the intricacies of how they live now. Rachel is looking to answer those questions using novel biologging technology, devising methods of attaching the devices safely onto wild reef mantas and then tracking the animals' time-energy budgets. She hopes her information about how, when and where reef manta rays are spending their time will aid future risk assessments for them.



OCEAN STORYTELLING GRANTS 2022



Left: The impact we have is amplified by engaging storytelling. Imagery can have the power to capture people's attention and to connect diverse audiences with the natural world in a way that scientific fact alone cannot.

Above: The winners of our Storytelling Grant work closely with project leaders in the field, helping them to communicate their science and reach larger audiences.

OCEAN STORYTELLING GRANTS

The Save Our Seas Foundation's (SOSF) work supporting research, conservation and education projects has always been underscored by the understanding that its impact can be amplified through engaging storytelling. To grow and nurture a wider community of conservation storytellers who can reach a diverse audience and help to engage hearts and change minds, the SOSF proudly launched a new category of grants that found its footing in 2022. The grants build on the legacy of the previous photography grants and focus on supporting a more diverse generation of conservation journalists and photographers.



ACACIA JOHNSON
ALASKA, USA



GABRIELLA ANGOTTI-JONES
CALIFORNIA, USA



THE OCEAN STORYTELLING PHOTOGRAPHY GRANT

The four winners of the Ocean Storytelling Photography Grant, which was launched in 2021, were announced early in 2022. Acacia Johnson, Gabriella Angotti-Jones, Sarang Naik and Shane Gross were all given a three-week assignment to document an SOSF project and spent the year being mentored in their research by judges Thomas Peschak, Kathy Moran and Jennifer Pritheeva Samuel.

'I just love the way she sees, I love the way she thinks. I think she ticks all the boxes as someone who is committed to the craft of storytelling,' said judge Kathy Moran of Acacia, who hails from Alaska, USA, and is an emerging storyteller who aims to use her work to influence environmental decision-making.

Gabriella comes from California and explores the relationship between people and the ocean through her imagery. Judge Thomas Peschak waxed lyrical

about her creative approach: 'When you look at Gabriella's work, you can just feel her creativity bubbling over from every image.'

Sarang's photography is interesting in that it documents life in the often-overlooked intertidal zone and along the shoreline. Kathy Moran had this to say about the photographer, who comes from Mumbai, India: 'His work is really original. I see in him someone who is young and creative, who has real potential as a storyteller. We're going to witness something really exciting as his career develops.' And finally, Jennifer Pritheeva Samuel commented on Canadian winner Shane Gross, saying 'He's always trying new approaches and techniques to make his images stand out.' Shane began his assignment in 2022, while the remaining three photographers are set to chart their own journeys in early 2023.



SARANG NAIK
MUMBAI, INDIA



SHANE GROSS
BRITISH COLUMBIA, CANADA



THE OCEAN STORYTELLING WRITERS GRANT

The new Ocean Storytelling Writing Grant was launched in 2022 and by the end of the year 147 applications from writers from all over the world had been received. This incredible response is a promising sign as we search for exciting new talent and confirms that a grant like this is of serious value to the conservation storytelling community. Author and broadcaster Dr Helen Scales and conservation journalist Swati Thiyagarajan from the Sea Change Project are highly valued additions to the inaugural judging panel, joining SOSF CEO Dr James Lea, SOSF content manager Jade Schultz and SOSF scientific writer Dr Lauren De Vos in their quest to find the rising stars of storytelling. The three winners will be selected from this inspiring cohort of applicants and announced in early 2023.

*'I just love the way she sees,
I love the way she thinks. I think
she ticks all the boxes as someone
who is committed to the craft
of storytelling,'*

KATHY MORAN

SPONSORSHIPS 2022



Left: This striking image, by conservation photographer Thien Nguyen Ngoc, captures the extent of anchovy fishing practices in Phu Yen Province, Vietnam. It was the first winner of the SOSF Marine Conservation Photographer of the Year Award, a category of the prestigious Underwater Photographer of the Year competition sponsored by the Save Our Seas Foundation in 2022.

Above: The Save Our Seas Foundation had a presence at several events in 2022, including the Wavescape Surf and Ocean Festival in Cape Town, South Africa. The longstanding partnership between the foundation and the Wavescape Festival has evolved into an artistic expression of appreciation for South Africa's sharks.

Sponsorships placed the Save Our Seas Foundation (SOSF) at the epicentre of shark science, conservation storytelling and ocean awareness in 2022. These collaborations helped the SOSF to reach a diverse audience, amplifying our reach in our quest to shine a light on shark and ray conservation.

SHARKS INTERNATIONAL

A MEETING OF SCIENTIFIC SHARK AND RAY MINDS

Every four years, the Sharks International conference has brought the international shark and ray scientific community together. This in-person and online gathering in October 2022 was particularly important in a newly post-Covid world. Six hundred scientists, advocates and educators from 69 countries gathered for five days online (10–14 October) and in person (20–22 October) at the Oceanogràfic aquarium in Valencia, Spain. Presentations by SOSF Shark Education Centre (SOSF-SEC) director Dr Clova Mabin, content manager Jade Schultz and SOSF D'Arros Research Centre (SOSF-DRC) research assistant Dillys Pouponeau brought the SOSF's mission to the fore at the in-person event. Their talks highlighted the



Left: L'Oceanogràfic in Valencia, Spain, proved to be an impressive venue for Sharks International 2022.

Right: More than 350 attendees gathered at Sharks International to discuss priorities in shark conservation and research, and many more joined online. The aquarium provided an interesting venue, complete with a live underwater backdrop for the keynote stage.

SOSF-SEC's work in reaching under-resourced communities, the communications strategy pioneered by the SOSF Conservation Media Unit and the conservation value of the research undertaken at D'Arros Island and St Joseph Atoll. The Save Our Seas Foundation sponsored the entire event, including an icebreaker evening function to fast-track networking. Two events engaged the public: Sharks in the Garden invited the local community to join the SOSF in the Jardí Botànic greenhouse on 16 October 2022 to meet a variety of organisations and universities. That evening, the SOSF hosted another free public event: Shark Night in the Jardí Botànic auditorium, at which the audience was transported by the adventure, travel and conservation stories of eight speakers. The SOSF's presence was felt throughout the in-person conference, with a film crew gathering footage and social media content and Dr Isla Hodgson of the SOSF's World of Sharks recording new podcast episodes.





Above left: Pro surfer Ricky Basnett and podcast host Steve Shooter at Wavescape annual Surf and Ocean Festival with their retro-inspired goodie bags.



Above, right: At Wavescape 2022, the African premiere of *Girls Can't Surf* was shown at the Labia Theatre, Cape Town. As sponsor of the festival, the Save Our Seas Foundation attended the premiere and provided goodie bags.

WAVESCAPE FESTIVAL AN ANNUAL CELEBRATION OF OUR OCEANS

Capturing hearts and minds was the mission of the collaboration between the SOSF and Wavescape to activate the Beach Reach at Dalebrook Beach in Cape Town, South Africa. The festival engaged South Africans, including children from the 9 Miles Project (a surf programme for vulnerable youth), on the protected shore opposite the SOSF-SEC, inspiring in them a love for sharks. This vibrant and upbeat approach continued in the activation of the African premiere of the film *Girls Can't Surf* at the Labia Theatre in Cape Town.

The festival engaged South Africans, including children from the 9 Miles Project (a surf programme for vulnerable youth)

Right and below: More than 1,700 industry professionals from around the world gathered at the 40th Wildscreen Film Festival in Bristol, UK. As principal sponsor, the Save Our Seas Foundation hosted a panel session on sharks in the media and presented the brand-new Impact Category of the Panda Awards.



WILDSCREEN FILM FESTIVAL A PREMIERE FOR THE SOSF

In a similarly ocean-optimistic vein, a new sponsorship came to fruition in 2022 with the 40th edition of the Wildscreen Film Festival. With more than 1,700 attendees from 32 countries and featuring 153 speakers from 20 countries, Wildscreen provides an established partner to engage the nature film industry and reach a worldwide audience. The Save Our Seas Foundation, the first marine-focused NGO to be a Principal Sponsor of the festival, led marine conservation discussions, presented the Panda Awards' new Impact category, collaborated on the Wildscreen Festival Roadshow to take the best films around the UK and drove the international hub in Cape Town, South Africa.





Local children in the Palawan Province, Philippines, pose with a film slate for Project Leader Sally Snow. Sally is working with local communities and researchers to produce a film that focuses on the sharks and rays

of the Sulu Sea, combining the stories of the community with the area's natural history.

UNDERWATER PHOTOGRAPHER OF THE YEAR

The Save Our Seas Foundation partnered with the Underwater Photographer of the Year award to sponsor its Marine Conservation Photographer of the Year title. Thien Nguyen Ngoc won this category with his bird's-eye view of anchovy fishers off Vietnam's Phu Yen Province.

MUSEUM OF DISCOVERY AND SCIENCE SPEAKING OF SHARKS AND SCIENCE

In Fort Lauderdale, USA, the Museum of Discovery and Science (MODS) unveiled the SOSF Shark Bio Cart to the 500,000-plus visitors who entered its doors during 2022. Placed in September 2022, the Bio Cart gave the museum's visitors another opportunity to engage with the lives of sharks. Once again, MODS also hosted the SOSF Distinguished Speakers series online. From manta rays with Don Croll and Melissa Cronin to whale sharks with Jonathan and Sofia Green, the range of speakers gave attendees access to global research. The Deep-sea Sharks Panel Discussion, this time hosted with Sofia Graça Aranha and Diana Catarino, provided unique insights and generated particular interest from the audience.



Giant prints of ocean images decorate Neuchâtel in Switzerland. This is the final instalment of Exposub, a free, open-air exhibition celebrating some of the world's best underwater photography.

ART INSTALLATIONS, EDUCATIONAL EXHIBITIONS AND CONFERENCES

An existing collaboration between the SOSF and the Two Oceans Aquarium in Cape Town, South Africa, continued to find an engaging foothold for visitors to the SOSF Shark Exhibit and Shark Alley.

The final rendition of Exposub, an underwater photography exhibition, brought the wonder, whimsy, weirdness and worries of our world's waterways – our oceans, lakes and rivers – and their conservation challenges, to Neuchâtel in Switzerland.

The SOSF's contribution of striking images and video footage enabled sharks and rays to make a splash at the American Museum of Natural History's exhibition *Shark!*, which runs from 15 December 2021 to 4 September 2023.

Establishing its longevity online, the Marine Biological Association once more hosted its Young Marine Biologist Summit. The SOSF sponsored its 2022 event, themed 'Hidden Ocean', which helped young people engage with scientists, educators and advocates.



SAVE OUR SHARKS! BOOK

A fresh collaboration with 10 up-and-coming illustrators from École Supérieure de Bande Dessinée et d'illustration de Genève resulted in the publication of the book *Save Our Sharks!*, which was available in Payot bookstores across Geneva and Lausanne in Switzerland from June 2022. The connections made with these illustrators gave rise to an exciting reservoir of talent, with illustrators like Rebecca Traunig earmarked for future commissions in the SOSF magazine.

After two challenging years that forced the SOSF team to reflect anew on how to engage audiences in meaningful ways, the sponsorships of 2022 showed that strong connections have now been fostered and highly impactful engagement routes are being established. While the basis of the work from the SOSF is undoubtedly seen across its project leaders and their research, it is in these creative channels that the SOSF finds a foothold that is almost entirely unique. By reaching more people and inspiring wonder, or provoking challenging new thought patterns about our oceans, the SOSF's communications team are able to guide audiences to find their own place in contributing to the sustainability of our seas and the preservation of sharks and rays.

The SOSF team is constantly looking for fresh, innovative ways to engage new audiences. In 2022, *Save Our Sharks!*, a collaboration with 10 illustrators, uses punchy facts and quirky artwork to convince the reader of the need to respect and protect sharks.

OUR TEAM

OUR CORE OPERATIONS ARE HANDLED BY A SMALL NUMBER OF PASSIONATE PEOPLE, DEDICATED TO MARINE CONSERVATION AND LOCATED IN VARIOUS OFFICES AROUND THE WORLD.

- 1 **SOSF HEADQUARTERS** | GENEVA | SWITZERLAND
- 2 **SOSF SHARK EDUCATION CENTRE** | KALK BAY | WESTERN CAPE | SOUTH AFRICA
- 3 **SOSF SHARK RESEARCH CENTER** | DANIA BEACH | FORTLAUDERDALE | USA
- 4 **SOSF D'ARROS RESEARCH CENTRE** | D'ARROS | SEYCHELLES
- 5 **SOSF ISLAND SCHOOL** | MAHÉ | SEYCHELLES





JAMES LEA
CHIEF EXECUTIVE OFFICER

James is the chief executive officer of the Save Our Seas Foundation. He has had a fascination for the marine realm from a young age and it was this that sparked his ambition to explore the oceans. Having been humbled by encounters with various shark species, he became keen to learn as much as he could about their behaviour and ecology.

James gained a first-class Honours degree in biological sciences from the University of Oxford and then volunteered as a shark researcher at the Bimini Biological Field Station. At Bimini he cut his teeth catching, tagging and tracking sharks, and working with them so closely consolidated his passion and further motivated him to fight for marine conservation.

He then moved to work as a research scientist for the Save Our Seas Foundation, before completing a PhD in marine biology at the University of Plymouth in collaboration with the D'Arros Research Centre. His primary research focus was a comprehensive tagging programme tracking almost 200 sharks of seven different species in Seychelles, aiming to determine the factors that drive their movement behaviour and use this knowledge to inform effective conservation strategies. James's research has helped to contribute to the design of marine protected areas and has revealed previously unknown open ocean migrations of tiger and bull sharks, highlighting the challenge of managing shark populations that span ocean basins. He continues his research as part of the Evolutionary Ecology Group at the University of Cambridge.

James fully realises the importance of actively promoting awareness of marine conservation issues, so he is particularly excited to lead the Save Our Seas Foundation team to help ensure that we can live with healthy oceans for generations to come.



SANDRINE GRIFFITHS
GRANT PROGRAMME MANAGER

Sandrine first became passionate about biology and genetics in college, although from an early age she had always felt a strong need to be immersed in nature. Born in Switzerland, she was lucky to spend long vacations by the Mediterranean Sea, savouring the elements and admiring the marine fauna as she tried to follow her father, a free-diver. Later she travelled less often, so the Swiss mountains and Lake Geneva, one of the largest lakes in Western Europe, fed her need for nature.

A biologist by training, Sandrine taught science to teenagers before joining a biotech company where she acquired strong project management skills. After seven years, an opportunity arose that enabled her to set up her own business and open a sailing and nautical sports store on the shore of Lake Geneva. It was this adventure that reminded her how much she wanted to take care of the many aquatic ecosystems and their wildlife that are degraded by human activity. She is passionate about living creatures in all their forms.



STEFAN KUBICKI
IT AND WEB OFFICER

Stefan grew up in North Dakota, about as far away as it's possible to get from the coast in the USA. He first developed a fascination with sharks and the underwater world thanks to nature documentaries and well-worn issues of *National Geographic*. He began his career as an analyst at a UN-based NGO in New York before moving to London, where he worked as a web developer and advisor to several startup companies. He joined the Save Our Seas Foundation in 2010. Aside from his work for the foundation, Stefan is an award-winning filmmaker whose films have screened at festivals around the world.



AURÉLIE GROSPERON
COMMUNICATIONS STRATEGIST

Born and raised in the French Alps, Aurélie developed a strong connection with the natural elements: mountains, lakes and the ocean. She became an expert skier, sailor and diver, loves adventure and also enjoys contact with people who are passionate about nurturing a vision for a better world. Environmental issues, the legacy for the next generation and educational objectives are what matter to this dynamic woman.

Aurélie graduated from an international business school in Paris in 1992 and went on to work mainly with premium brands such as Rolex, Oakley and Dynastar. Her fields of expertise are public and media relations, sponsoring, advertising and event management.

In April 2019, after a career in the sport and luxury industries, she felt it was time for her to reconnect with her personal aspirations and follow a new professional direction. She joined the Save Our Seas Foundation in Geneva to handle its communications strategy and make the organisation's activities and ambitions better known to the general public. For Aurélie it's a new reality that makes perfect sense, a role that matches her preference for exploration, conservation and innovation.



JADE ROBYN SCHULTZ
CONTENT MANAGER

From a young age when she and her family would go on holiday to nature reserves and the seaside, Jade has felt a very strong connection to the natural world and a great appreciation for its overwhelming beauty. With time however, she realised that this was a view few others shared. Having experienced in particular how little other people know about the wonders of the ocean, she became acutely aware that they know even less about the dangers that the marine realm faces.

With a background in marketing and media experience, Jade understands that the media is extremely powerful when it comes to spreading a message and raising awareness – and, in fact, in today's digital world it is an invaluable conservation tool. She believes that the knowledge and experience that she is able to bring to the Save Our Seas Foundation's Conservation Media Unit, together with the passion and dedication of the other team members, can and will make a positive difference in the mindset of the public – and, ultimately, the health of our oceans.



THOMAS P. PESCHAK
DIRECTOR OF STORYTELLING

Thomas P. Peschak is a National Geographic Photographer, Explorer and Fellow who specialises in documenting both the beauty and the fragility of the world's oceans, islands and coasts. For *National Geographic* Magazine he has produced 10 feature stories that cover various natural history and conservation issues, ranging from manta rays to marine protected areas.

Originally trained as a marine biologist, Thomas embraced photojournalism 15 years ago after realising that his photographs could have greater conservation impact than scientific statistics. He is a founding director of the Manta Trust and a senior fellow of the International League of Conservation Photographers. His images have won 17 Wildlife Photographer of the Year and seven World Press Photo awards. Thomas has supplied the photographs and text for seven books, including *Currents of Contrast*, *Sharks & People* and *Manta: The secret life of devil rays*. He is a popular speaker for National Geographic Live, having presented more than 20 shows in 15 cities on three continents. His official 2015 TED talk, 'Dive into an ocean photographer's world', has been viewed more than one million times.



LAUREN DE VOS

SCIENTIFIC WRITER

Lauren has loved wilderness and wildlife since she can remember and it was her curiosity about life on earth that led her to science. As a child, her attentiveness to all life, right down to scooping the ants out of the bathtub before running the water, was probably a giveaway to her family as to her career direction in conservation...

Lauren graduated with a BSc in environmental and geographical science, followed by Honours in zoology and an MSc in conservation biology at the University of Cape Town. She went on to work as a researcher at the university and became an SOSF project leader, leading a project that aimed to introduce BRUVs monitoring to South Africa's marine protected area network and working with local conservation agencies to design methods that could be simply and effectively repeated at low cost around the coast. She then completed her PhD using remote camera methods to assess the biodiversity of South Africa's largest bay. Her career has spanned scientific research, marine education and storytelling through film and writing. She has worked previously for the I AM WATER Foundation, where she is a current trustee, and as a lead marine biologist on the Oceans Alive project in the iSimangaliso Wetland Park, a UNESCO World Heritage Site, for WILDOCEANS, a programme of the WILDTTRUST.

As a marine biologist, Lauren has worked in some beautiful places. Her love of nature has guided her career in science and conservation, but through her research she has become increasingly aware of the challenges we face. Her approach has always been to act to secure her hope that we can build a better future. She believes that her writing can help to encourage others to become conscious of their own connections to nature. By translating science into stories, Lauren is acting on her optimism that change is possible.



KELLI WHITEHEAD

SOCIAL MEDIA MANAGER
AND CONTENT MARKETER

Growing up on the west coast of South Africa in a family of sailors set the stage very early in life for Kelli's deep connection to the ocean. As a youngster she travelled to many places around the world, experiencing them through sailing and forming an intense love and respect for the sea. Soon after commencing her studies at the University of Stellenbosch, she began embracing the ocean even more, leaning towards volunteer and education programmes alongside her degree in linguistics.

In 2018 she opened her own international yacht charter agency, hoping to inspire people to travel the world and to experience the magic of the marine world. After shifting focus to her growing passion for marine conservation and finding a deeper understanding of how important online media can be for the conservation of the natural world, Kelli joined the Save Our Seas Foundation's communications team in 2020. She hopes to spark joy and inspiration in the minds of those who engage with the foundation online in a way that brings about a positive change for the plight of our oceans.



NICOLA POULOS

GRAPHIC DESIGNER AND VIDEO EDITOR

Growing up on the beaches of Durban and Jeffreys Bay, South Africa, with her large family was the root of Nicola's deep respect for the natural world and she has been an earth-child and ocean-lover ever since. The rest of her story evolves into a love for surfing, diving, balance, health, sustainability and conservation. She is an active, nature-loving, waste-free advocating eco-warrior, usually spotted on her bicycle.

Nicola graduated from Rhodes University with a Bachelor of Journalism and Media Studies, specialising in creative communication and psychology. Since then she's been grappling with the challenge of how to communicate an ethic, specifically one of environmental consciousness: an awareness of, and responsiveness to, uplifting one's surroundings.

Her career has taken her through the media industry, in magazines and publishing, lifestyle and action sports, museums and exhibitions, events and festivals, in South Africa and the United Kingdom. With these foundations in print and digital graphics production, Nicola strives to make a positive impact through her craft as a designer for the Save Our Seas Foundation.

In a world saturated with trivial distractions, she believes that honest, impactful and captivating communication techniques are vital. As much as graphic design is rooted in communicating ideas that inspire, inform and captivate consumers, she believes in its capacity to also generate awareness and effect positive change.



JAMY SILVER

VISUAL CONTENT DESIGNER

Jamy grew up a compulsive picker-up of litter and a chronic rescuer of miscellaneous small creatures from various sticky situations. After graduating with a degree in communications, she quickly realised that the default career in advertising wasn't going to be contributing towards anything she valued (in fact, aggressively the opposite). Life is short, so she looked to translate those same skills into a more meaningful direction – conservation and science communication – and hasn't looked back.



ISLA HODGSON

SCIENCE COMMUNICATOR

Isla grew up with the icy waters of the North Sea as her playground and spent a happy childhood surfing, wild swimming and poking around rock pools. Those early years sparked a lifelong fascination with the underwater world and she has lived by the ocean ever since, swapping the rugged coastlines of northern England for the vibrant wilderness of the Hebrides on Scotland's west coast. Keen to learn as much as possible about life beneath the waves, Isla studied marine science at the University of Aberdeen and gained a Master's degree studying the habitat use of minke whales in Scottish waters. It was during this time that she learned to scuba dive, which opened up a whole new world of ocean exploration. She then went on to complete a PhD, which focused less on the marine life and more on the animals impacting it: humans. She is now an expert in conservation conflicts, environmental governance and conservation social science and has advised Scottish and UK government and international conservation bodies, including WWF and the IUCN.

Isla discovered her passion for science communication as an undergraduate while working for a local aquarium, where she gave talks to the public about the sharks and rays under her care. She later went on to work for the BBC as a researcher and producer and wrote for outlets such as *BBC Wildlife* and *The Naked Scientists*. In 2019 she took a break from academia to work as a guide for Basking Shark Scotland, a job that involved swimming with the second-largest species of shark in the world, collecting data and showcasing the sharks and their habitat to the public. During lockdown she gave several online talks sharing her passion and enthusiasm for basking sharks, which led to a job in science communication with the Save Our Seas Foundation. Isla now considers herself to have the best job in the world: talking about sharks and shark science with the people who know them best and promoting how awesome these animals really are.

SCIENTIFIC COMMITTEE



SARAH FOWLER
SCIENTIFIC ADVISOR

Sarah has a first class joint honours degree in zoology and marine zoology from the University College of North Wales, an MSc in conservation from University College London and 30 years of professional experience as a marine biodiversity conservation expert. She has worked in various capacities for government departments, national and international NGOs and a biodiversity consultancy. Having been appointed to the IUCN Shark Specialist Group in 1991, she chaired it for many years and is now its vice-chair for international treaties.

Sarah founded the European Elasmobranch Association and its UK member, the Shark Trust (and is a trustee of the latter). She was appointed Officer of the Order of the British Empire for services to marine conservation in 2004, and a Pew Fellow in Marine Conservation in 2005. She became principal scientist for the Save Our Seas Foundation in 2011.



DEAN GRUBBS
SCIENTIFIC ADVISOR

Dr Dean Grubbs is a fish ecologist with interests in the biology of exploited and poorly studied estuarine and marine taxa. Much of his research addresses specific gaps in biological knowledge necessary for the management and conservation of coastal and deep-water sharks and rays. Dean specialises in the use of fishery-independent surveys to study population dynamics and the drivers of distribution patterns of fishes and to facilitate studies of life histories, reproductive biology, trophic ecology and systematics. Dean has also tagged and released more than 10,000 sharks representing over 40 species during the past 25 years. He employs a variety of tagging and telemetry techniques to examine movement, migration and patterns of habitat use and to delineate essential and vulnerable habitats for exploited, threatened or poorly studied species.

Dean is a native of Florida and his early years spent fishing and exploring the waters of the north-eastern Gulf of Mexico led to an early interest in marine biology. He received Bachelor's degrees in marine science and biology from the University of Miami and a doctoral degree in fisheries science from the College of William & Mary's Virginia Institute of Marine Science. Dean was a post-doctoral researcher and faculty member at the Hawaii Institute of Marine Biology before moving to Florida State University (FSU) in 2007. He is a member of the IUCN Shark Specialist Group, the National Oceanographic and Atmospheric Administration (NOAA) Office of Protected Resources' Smalltooth Sawfish Recovery Team and NOAA's SouthEast Data Assessment and Review Advisory Panel for Highly Migratory Species. Dean is currently the associate director of research at the FSU Coastal and Marine Lab, where he mentors graduate and undergraduate students and maintains an active research programme on the ecology of deep-water and coastal fishes. His research has been featured in many television documentaries, including National Geographic TV, National Geographic Wild, Discovery Channel and the US Public Broadcasting System.



ANDREW CHIN
SCIENTIFIC ADVISOR

Dr Andrew Chin is a fisheries scientist whose work focuses on shark and ray biology and ecology, and how the information from this research can be translated into conservation and sustainability. Specifically, Andrew is interested in how fishes use coastal and marine habitats and how patterns of use affect their vulnerability to pressures such as fishing, habitat loss and climate change. His recent research spans the life history and biology of sharks by means of tagging and acoustic telemetry, as well as risk assessment. As an applied scientist, Andrew is also very interested in how fishes, sharks and rays interact with people and how their populations can be managed, as well as in impacts on their populations.

Andrew grew up in South-East Asia but currently lives in Queensland, Australia, where he received his PhD from James Cook University. He has a diverse marine background, having worked as a marine biologist in the tourism industry and as an education officer in a public aquarium. He also spent 10 years working at the Great Barrier Reef Marine Park Authority, the Australian federal agency charged with protecting the Great Barrier Reef. In 2017, Andrew launched SharkSearch Indo-Pacific, an effort that blends formal research, citizen science and public outreach, and aims to develop a scientifically robust shark diversity checklist and conservation account for every country and territory in the Pacific by 2022. He is also one of the founders of the Oceania Chondrichthyan Society and a member of the IUCN Shark Specialist Group.

SOSF SHARK EDUCATION CENTRE
KALK BAY | WESTERN CAPE | SOUTH AFRICA



CLOVA MABIN
DIRECTOR

Originally from Scotland, Clova became fascinated by sharks while working as a diving aquarist in an aquarium that housed ragged-tooth sharks. She came to South Africa in 2005 to work with tiger sharks on the east coast before joining the White Shark Trust in Gansbaai as a research assistant. While in South Africa, she became involved in the wildlife film industry, where she learned the basics of communicating science to a wider audience. Keen to further her education, she went on to complete an MSc in conservation biology and then a PhD focusing on the status and management options for marine species that have invaded South African shores. This applied research made her realise how inaccessible most science is to the general public and how this contributes to the many conservation issues we face today.

Clova loves to travel, but when in South Africa she spends her free time outdoors on the water or in the mountains. She is a certified PADI dive master and South African commercial diver. As a volunteer for several organisations that focus on environmental education and the mother of a nature-loving daughter, she enjoys teaching children about ecology and sustainable lifestyle choices. She is passionate about sharing her love and knowledge of the marine environment, as she believes this is the only way we can change our future.



CLAIRE METCALF
FACILITIES ADMINISTRATOR

Raised in various small West Coast fishing and mining towns of South Africa and Namibia, with parents whose free-range approach to parenting meant lots of time outside exploring beaches, Claire is a firm believer in the power of experiential education in moulding future generations to become effective conservationists. Claire joined the Save Our Seas Foundation Shark Education Centre in May 2016 after almost eight years with Liberty Life Financial Services as a franchise business support administrator. With a diploma in administration and legal studies from Montrose Business College in Cape Town, in her role as the facilities administrator she brings a high level of organisation and structure to the dynamic working environment that is the Shark Education Centre. She is enjoying every minute of the varied opportunities this role brings and, in addition to seeing to facilities maintenance and administration, she has become a vital part of the team, joining school groups as they learn about, explore and appreciate the ocean. She has also made it her personal mission to convince the education centre's resident puffadder shysharks to eat their food. With a family that has earned – and continues to earn – its income almost entirely from the sea, Claire has a vested interest in the conservation of the oceans for current and future generations. She believes that she is in exactly the right place to be able to contribute to this.



ANNA JAMES
EDUCATION COORDINATOR

Born in Cape Town, Anna James was raised between that city and Johannesburg. Her passion for ocean-focused environmental education was cultivated while working as a researcher and educator on the One Ocean Hub research project, which involved working closely with small-scale fishers along the South African coastline and advocating for recognition that these fishers are socially and ecologically valuable and for support of their efforts to defend the South African ocean from oil and gas mining. During the course of the project she learned much about the ocean from people who live in coastal communities and began to understand the many types of literacy needed to address challenges facing the ocean.

Anna has spent most of her tertiary education and working life considering the question of social and ecological justice in South Africa's conflicted and messy post-apartheid period and this has culminated in an interest in the processes and politics of education and the link between learning and collective action for system change. Her doctoral research looked at the potential of arts-based education for environmental learning that resonates with the everyday realities of contemporary urban environmental concerns. She takes most of her inspiration from land, coastal and water-based social movements.

As a keen ensemble musician, Anna believes strongly that ensemble music and dance have something to teach us about how to create spaces in which we can facilitate the difficult dialogues that need to be had as we move forward to a more socially and ecologically just world.



KAREN MERRETT
EDUCATION COORDINATOR

For as long as Karen can remember, she has felt her happiest when connecting with the natural world and sharing that excitement with those around her. Born and raised in Cape Town – and still living there – she was privileged to be able to spend time exploring a diverse range of habitats, from mountain peaks to the world below the ocean’s surface, and everything in between.

Her interest in environmental education was ignited while she was studying nature conservation and gaining work experience as a student at Blaauwberg Nature Reserve. During this time she discovered how the simple act of sharing her knowledge and excitement was infectious to those around her. After eight years of working across Cape Town in this field, it is safe to say the flame is still burning brightly. Karen continues to be inspired by witnessing over and over again the power of providing safe spaces in which people can develop and strengthen their own relationship with the natural world.

Although Karen has always found the marine environment fascinating and full of wonder, it was only as an adult that she took the plunge to expand her exploration beyond the rocky and sandy shores. Taking up snorkelling as a hobby enabled her to view the treasure trove of life existing beneath the surface through her own lens and to solidify her relationship with the underwater realm.

Karen joined the Save Our Seas Foundation Shark Education Centre team as education coordinator in October 2022.



JUSTINE SWARTZ
EDUCATOR

Justine grew up in the greater Cape Flats area and always loved adventuring with her mom and younger brother, walking from central Cape Town to the beach at Camps Bay to swim. She particularly enjoyed walking past Table Mountain and being able to admire the great rock massif and the beauty of nature around it. In her final year at school she began volunteering at an organisation where she was involved with environmental camps and dragon-boat racing, which proved to be the start of an amazing journey into nature conservation. Looking back on it today, that journey has taken her from terrestrial and freshwater ecosystems to marine conservation. Justine believes in educating young minds, as they are the ones that will bring about change. Above all, she has a love for people and a passion for conserving the natural environment.



MAYIYA ZANELE
ASSISTANT EDUCATOR

Zanele was born in the northern part of South Africa’s Eastern Cape. Even as a young girl she enjoyed cooking very much, so when she completed her matric she decided to make hotel and catering management her career. In March 2008 she started working for the Save Our Seas Foundation as a housekeeper.

By reading books at the education centre and watching videos about the ocean environment, Zanele became interested in marine life. In June 2009 she joined a research trip to Seal Island in False Bay and there she saw a great white shark for the first time in her life. By the end of that trip she had fallen in love with the sea and decided to become an educator so that she can pass her enthusiasm on to the young generations of South Africa.



LOGAN BENJAMIN
TRAINEE EDUCATOR

I come from the Cape Flats, outside Cape Town. Growing up, I didn’t have many opportunities to explore. My family and I went to the beach twice a year, so I was always excited when the December holidays came around. I am extremely passionate about the natural world, which I learned about through reading books. I took part in selection camps and was finally chosen to take part in a conservation leadership programme that lasted for seven years. Through this, I learned about South Africa’s diverse natural beauty. I also had the opportunity to visit the Two Oceans Aquarium and observe how marine biologists were studying different marine species. From that point forward I decided that I wanted to become one of those people doing the research and educating people about it. I think it’s important that we create opportunities for young people by teaching and influencing them and showing them what the natural world is about. By doing that we create a better environment for everyone, whether we’re educating them about marine life or simply about easy ways to discard waste responsibly. I think that brings about change in more ways than one.



WADE NAUDE
JUNIOR EDUCATOR

Although I grew up in Paarl, far from the sea, I had a passion for the ocean and studied marine science at the Cape Peninsula University of Technology. There I began to understand more about the marine environment and its species, as well as the benefits people obtain from the ocean. While studying, I spent as much time as possible near the sea, attending beach clean-ups and volunteering at the Southern African Foundation for the Conservation of Coastal Birds (SANCCOB). During my time as an intern at the Save Our Seas Foundation Shark Education Centre I realised that education about marine science is crucial, especially for communities of colour, where I come from. Often when people hear the word ‘science’, they feel overwhelmed because of the way science is introduced to them. Often, too, they have a misperception about the ocean. If there were ways to simplify the information or make it relatable to communities of colour, it would be easier to get them interested in learning about the ocean. I would like to reconnect these communities to the ocean and nature, and to break the barriers, especially in education, that were created by the apartheid system. With the aim of creating a sense of stewardship, I recently persuaded my community to clean up along the Berg River that flows through Paarl. I am also a dancer, and I believe that dance and other art forms can be used to share messages about environmental awareness.



LILLIAN NGOTSHANE
HOUSEKEEPER

Lillian was born and raised in the Eastern Cape, South Africa, and attended a rural primary school near Middledrift. The nearest coast was almost two hours away by bus, so the village children would spend their free time playing in and around the local rivers. Lillian was a teenager when she saw the ocean for the first time. After completing secondary school, she started working as a seamstress in a local factory before moving to Cape Town in search of work. In 2015, she became the housekeeper for the SOSF-SEC and was soon a treasured member of the team. She is the hands and heart behind all the food that we prepare for visiting groups of schoolchildren.

When Lillian started working for the SOSF-SEC, she was afraid of sharks and would never venture into the sea. Thanks to her experiences with the organisation and exposure to the marine environment, including some snorkelling, she now not only ventures into the sea without fear, but loves all the sea creatures and wants to make sure that we take care of them all.



MAHMOOD SHIVJI
DIRECTOR

Mahmood is professor of marine science at Nova South-eastern University's (NSU) Oceanographic Center in Florida and a director of the SOSF Shark Research Center. He received his undergraduate degree in biological sciences at Simon Fraser University in Canada, his Master's from the University of California, Santa Barbara, and his PhD from the University of Washington. He has been a faculty member at NSU since 1993 and a director of the SOSF Shark Research Center since 2010.

Mahmood credits his life-long fascination with biology to growing up in Kenya, where he was routinely exposed to African wildlife and undersea environments as a child and teenager. His interests in marine science in particular were boosted when as an undergraduate student he assisted one of his professors with kelp-bed ecology research. That experience led to a career in marine conservation science.

In addition to leading the research and education programmes of the shark research centre, Mahmood directs the Guy Harvey Research Institute, emphasising collaborative projects between the two entities to achieve larger and more impactful research and conservation outcomes. He specialises in integrating laboratory genetics and field work to solve problems pertaining to the management and conservation of sharks and rays, billfishes and coral reef ecosystems.

Mahmood's work consistently receives worldwide attention. His research developing rapid DNA forensic methods to identify shark body parts is being used by US and other national fisheries management agencies to reduce the illegal fishing of threatened species. This work is also on exhibit at the Smithsonian Museum's Sant Ocean Hall in Washington DC, and his team's research discoveries have been widely reported in the national and international media.



ANDREA BERNARD
RESEARCH SCIENTIST

Andrea grew up in Toronto, Canada, and spent many hours sailing on Lake Ontario. From a very young age, she has loved watery environments, dipping her toes into Ontario's Muskoka lakes, Florida's coastal waters, and even a neighbourhood pool. As a high school student, she travelled to Canada's east coast and studied the great tides of the Bay of Fundy as part of a summer marine biology course, cementing her future career path to the study of aquatic science.

Andrea subsequently earned a Bachelor's degree at the University of Guelph, Canada, studying marine and freshwater biology, and after graduating she interned at both the Department of Fisheries and Oceans Canada Great Lakes Laboratory located in Burlington, Ontario, where she studied everything from algae to fish habitat, and at the Mote Marine Laboratory & Aquarium in Florida, where she came face to face with a shark for the first time – and never forgot the experience! She then returned to university and completed a Master's degree at the University of Guelph, investigating the population genetics of lake whitefish, followed by a doctorate at Nova Southeastern University (NSU), where she studied the population genetics of sharks, stingrays and billfishes. She is currently an associate research scientist at NSU and the SOSF Shark Research Center, where she investigates the population dynamics of mainly sharks, with an emphasis on genetics and genomics-based ecology and conservation.



MATTHEW JOHNSON
ASSISTANT PROFESSOR

Matt grew up in the beautiful Black Hills of South Dakota, where he spent his childhood fishing, camping and enjoying all that the woods offer. Coming from a family of fishers and hunters, he spent a lot of time at mountain lakes and brooks and was often distracted by catching frogs, snakes and minnows in the marshes when he should have been monitoring a fishing pole. His childhood dream to study the ocean and its inhabitants came from visits to a small roadside tourist attraction called 'Marine Life Aquarium', as well as from the home marine aquariums he attempted to maintain as a child.

Matt earned an undergraduate degree in information systems but changed career paths later in life to earn his PhD in marine biology and oceanography at Nova Southeastern University (NSU). Currently an assistant professor in the Department of Biological Sciences at NSU, he teaches various graduate and undergraduate courses, many of which focus on the integration of science and technology. He is also a researcher at the SOSF Shark Research Center, where his work involves computational biology as applied to investigating shark movement ecology and connectivity patterns of broadcast spawning marine species.

Matt lives on a small hobby farm in the country, raising chickens, parrots, and poodles. He also enjoys collecting fossils, many of which are relics of North America's Western Interior Seaway.



JEREMY VAUDO
RESEARCH SCIENTIST

Jeremy grew up in coastal southern California exploring tidal pools and taking classes and volunteering at the local aquarium, so the decision to pursue marine biology was made at a very early age. After studying biology for his Bachelor's degree at the University of California, Santa Barbara, he entered the shark research world while earning his MS at California State University, Long Beach, studying the movement patterns of round stingrays. During his PhD at Florida International University he continued his work on rays, investigating the habitat use and foraging ecology of a ray community in Shark Bay, Australia. Since joining Nova Southeastern University as a research scientist in 2013, Jeremy has applied his quantitative ecology skills to the open ocean, studying the movements and habitat use of large pelagic fishes, particularly sharks.



NINA PRUZINSKY
RESEARCH ASSOCIATE

Swimming lessons for two-year-old Nina were essential, as her eagerness to jump into the crashing waves made her family's trips to the beach hazardous. Intrigued by the water and the animals that lived in it, she was constantly trying to find fish and crabs along the water's edge.

A high school field course to Jamaica ignited her passion for studying the ocean and its inhabitants. Following an elective 'Oceans' course at the University of Delaware, Nina changed her undergraduate major from mathematics to environmental sciences, as she realised she was missing the adventure and opportunities for inquiry that the marine science courses offered. She also knew she could utilise her analytical skill set in the science field. Hands-on experiences like the field course in Jamaica, a study trip to the Cayman Islands and an internship researching coral symbiotic dinoflagellates prompted her to earn a Master's degree in marine science at Nova Southeastern University, where she studied the taxonomy, ecology and spatiotemporal distribution dynamics of the early life stages of tuna.

Nina's main interest is in researching poorly studied marine species and communities so that she can provide information to the public and improve conservation and management efforts. After her Master's degree, she worked as a project manager at a multi-institutional consortium researching deep-sea fish distributions. She also led database and sample management for the Aquatic Symbiosis Genomics Project's hub at NSU. Nina now works as a research associate at the SOSF Shark Research Center, managing the laboratory and its databases, developing media for outreach and conducting shark genetics research. A life-long learner, she strives to expand her expertise across a multitude of research areas.



ROBERT BULLOCK
RESEARCH DIRECTOR

Rob can trace his love for science and the marine world back to his youth and to Sir David Attenborough, whose words instilled a curiosity that soon grew into a passion for learning about nature. As an adult, Rob pursued this passion, studying marine and freshwater biology at the University of Hull. As he learned more about the marine realm and its inhabitants, he became particularly interested in the importance of species in healthy ecosystems and the need for science-based conservation. Through his education he discovered the amazing diversity among sharks, the fascinating roles they play in marine systems and the extreme threats they face.

Rob conducted his PhD research at the Bimini Biological Field Station, where he worked as a Principal Investigator and studied the fine-scale behaviour of young lemon sharks using the Bimini Island nursery sites. He then moved on to broaden his skill set as a post-doctoral research associate with the Marine Biodiversity Unit of the International Union for Conservation of Nature (IUCN), assessing extinction risk to marine species. Rob's career thus far has taken him to the intersection of scientific research and conservation action and he is driven to deliver science with tangible conservation outcomes.

SOSF D'ARROS RESEARCH CENTRE
D'ARROS, SEYCHELLES



HENRIETTE GRIMMEL
PROGRAMME DIRECTOR

Growing up in Germany and Switzerland, where competitive swimming and rowing meant that she spent a lot of time in and on water, Henriette has always had a strong connection to this element. Hiking and camping holidays with her family led to an enduring interest in animals and nature. She first dipped into marine biology while studying in the USA during a high-school exchange year, learning about marine species and snorkelling for the first time in Hawaii.

At university Henriette studied geography and environmental sciences and it took a few more years before she discovered an interest in diving in Lake Zurich and a fascination for sharks. She followed these up with saltwater experiences while volunteering in Mozambique, where she assisted in whale shark research and fish censuses. After further travels and a dive-master internship in Honduras, she went on to complete an Erasmus Mundus Master's in marine biodiversity and conservation, conducting her field study at the Bimini Biological Field Station in The Bahamas. She gained further experience in marine research while working with the Large Marine Vertebrates Research Institute (LAMAVE) in the Philippines, where she helped to monitor a mobulid fishery and assisted in shark research in Tubbataha Reefs Natural Park.

Although it was diving and sharks that got Henriette into marine science, she has always been interested in the complexities of ocean management and how humans interact with the marine world, so she completed a second Erasmus Mundus Master's, this time in maritime spatial planning from the universities of Seville, the Azores and Iuav Venice. Sharks and conservation remain close to her heart, but Henriette also has a very strong interest in understanding ocean processes, ecosystem services and how humans use them, and finding a pathway to governing that use in a sustainable manner.



ELLIE MOULINIE
RESEARCH OFFICER

Born and raised in Seychelles, Ellie loves the island life. She comes from a family of fishermen living next to the ocean, so school holidays meant enjoying the sun and sea every day and, as a strong swimmer, especially snorkelling and diving. Her love of animals, nature and the ocean and her desire to visit all 115 islands in Seychelles influenced her to pursue a Bachelor's degree in environmental science at the University of Seychelles. Only after learning how to dive did she realise that she wanted to specialise in marine science and fisheries. As an intern for Global Vision International she learnt about fish and marine invertebrates and their importance, and how to conduct surveys to monitor them. She ventured further into marine research by volunteering with the NGO Green Island Foundation, helping to conduct surveys on islands such as North, Denis and Fregate. In 2018 Ellie joined an Earthwatch team on Curieuse Island, where she participated in its Coral Communities in Seychelles Project.

Always moving her career in conservation forward, Ellie most recently worked with the Seychelles Islands Foundation as a field research officer on Aldabra Atoll, where her tasks consisted of conducting terrestrial surveys on the flora and fauna as well as marine research as part of Aldabra's annual marine monitoring programme. As a young emerging scientist and conservationist, she believes it is her duty and responsibility to do her part to protect global ecosystems and threatened species against anthropogenic stressors and the effects of climate change that are causing the loss of biodiversity.



DILLYS POUPONEAU
RESEARCH OFFICER

Originally from Praslin Island, home of the largest nut in the world (coco de mer), Dillys had some amazing experiences as a member of environmental clubs during her school years and these taught her the importance of protecting biodiversity. They inspired her to pursue a Bachelor's degree in environmental science, specialising in tropical biodiversity conservation, at the University of Seychelles.

As a young environmental conservationist with an interest in all living things and habitat types, Dillys has had the privilege of working on numerous terrestrial and marine projects, ranging from scientific research to environmental education and sustainability projects on several islands in Seychelles. She also has a strong interest in well-preserved biodiverse ecosystems, which she enjoys capturing on video and in photographs that enable her to raise awareness and engage people's interest. She is keen to fill her professional and private life with anything that is fun, artistic, creative, exploratory and adventurous, as long as it is in the wild. Dillys wishes to pursue her studies further and develop the necessary skills required to become a great scientist and nature photographer and videographer.

Her career began at the Vallée de Mai Nature Reserve, where she worked as a field research assistant before undertaking her academic degree. After finishing at university, she was employed as the sustainability manager at a five-star hotel and most recently she worked as the assistant conservation officer with the Island Conservation Society. She worked on Silhouette Island (93% national park and surrounding marine park) and at Aride Island Special Reserve and Marine Protected Area, where she coordinated conservation projects and managed a team of eight.

SOSF ISLAND SCHOOL
MAHÉ | SEYCHELLES



TERENCE VEL
PROJECT ADVISOR AND EDUCATOR

Before joining University of Seychelles in 2015 as a science laboratory technician and a field lecturer for BSc environmental science students, Terence Vel spent 16 years as a laboratory technician in various secondary schools. Twenty-one years ago he became a founder of Wildlife Clubs of Seychelles and during this time has managed the organisation's projects and coordinated environmental programmes in 40 schools on Mahé, Praslin and La Digue. In 2000 he worked as a technician on a project called 'Avian ecosystems in Seychelles', which was funded by the Global Environment Facility and implemented by the former BirdLife Seychelles. The project involved two distinct phases: in the first, ecological research was carried out on a number of the Seychelles' Inner Islands to investigate their biology and conservation potential; during the second, endemic Seychellois birds were translocated from certain islands to others that were more suitable. In 2008 Terence embarked on studies for a diploma in environmental education and social marketing at the University of Kent's School of Anthropology and Conservation. This led him to The Darwin Initiative Rare Pride Campaign to work on a project called 'Investing in island biodiversity: restoring the Seychelles paradise flycatcher'. The project was based on La Digue Island and aimed to translocate a small population of birds on Denis Island. Terence also conducts outreach programmes that focus on marine education for youth groups from the community.



SHEENA TALMA
EDUCATION COORDINATOR

Sheena is a marine biologist and the owner of Talma Consultancy, a marine-based company in Seychelles. She works with the Save Our Seas Foundation coordinating the D'Arros Experience, a camp dedicated to teaching students about the marine and terrestrial worlds. Sheena has a keen interest in learning more about how we use the ocean and the implications of overfishing, marine pollution and climate change in that relationship. She holds a Master's degree in ichthyology from Rhodes University and NRF-SAIAB in South Africa, and she is a National Geographic Explorer and a finalist for the local ocean hero award.

SEYCHELLES AMBASSADOR
MAHÉ | SEYCHELLES



HELENA SIMS
SEYCHELLES AMBASSADOR

Born and raised in Seychelles, Helena has a deep love for the sea. She has always felt drawn to the ocean, and marine biology was what she wanted to do for as long as she can remember. She first went diving on her 10th birthday and by the time she was 18 she was already a dive master.

She has always been an active volunteer for environmental causes in Seychelles and when eco-clubs started up while she was still at school, she became a founding member. In 2002 she won an eco-school award trip to Aldabra. Her dedication and hard work took her to Australia to study marine biology at James Cook University in Townsville, Queensland, and on her return she worked in the research section at the Seychelles National Parks Authority. A few years later she accepted the position of project coordinator at the Green Islands Foundation, a local NGO, before going on to manage a four-year GOS-UNDP-GEF protected areas project.

Helena has more than 10 years of experience in marine biology and conservation and project management. A highlight of her career was being part of the team to finalise the world's first debt-for-nature swap for a marine area. She is also the first woman to be appointed the chairperson of the Seychelles National Parks Authority. Currently she is working full time on an initiative to develop a marine spatial plan for Seychelles' entire Exclusive Economic Zone and to identify 30% of that area to be protected. The plan aims to balance ecological, social and economic objectives to ensure that the ocean and its resources are used sustainably.

The sea is within all Seychellois, believes Helena. It's not only in their blood, it's their life. She has dedicated her career to helping ensure that this way of life is maintained and preserved. An island girl by nature and profession, she feels blessed to be living and working in such a beautiful country. Her heart, she says, beats to the rhythm of the ocean around Seychelles.

ALL PROJECTS FUNDED BY THE SOSF IN 2022

SOSF CENTRES

SOSF D'Arros Research Centre | Bullock & Grimmel

SOSF Shark Education Centre | Mabin

SOSF Shark Research Center | Shivji

SOSF PARTNERS

Bimini Biological Field Station Foundation BBFSF | Elasmobranch research, education and conservation in Bimini, Bahamas | Smukall

Manta Trust | A global strategy and action plan for the long-term conservation of mobulid rays | Stevens

North Coast Cetacean Society NCCS | Cetacea Lab | A voice for whales | Wray

Shark Spotters | Finding the balance between recreational water-user safety and white shark conservation | Waries

The Acoustic Tracking Array Platform ATAP | A nationwide marine science platform | Cowley

SPONSORSHIPS

CONFERENCE | Sharks International 2022, Valencia, Spain

CONFERENCE | American Elasmobranch Society (AES), July 2022, Spokane, WA, USA

EVENT | Exposub, Neuchâtel, Switzerland

EVENT | Wildscreen Festival, Bristol, UK

SPONSORSHIP | Museum of Discovery & Science (MODS) | SOSF Distinguished Speaker Series & Shark Cart

SPONSORSHIP | Two Oceans Aquarium, Cape Town, South Africa

SPONSORSHIP | Student Travel Grant | Oceania Chondrichthyan Society (OCS)

EDUCATION | Young Marine Biologist Summit

EDUCATION | *Save Our Sharks!* book | Good Heidi Production

EDUCATION | *Older than Trees* film | Pippa Ehrlich & Tasmin Vosloo

EDUCATION | *Jaws* Podcast | David Ebert

EDUCATION | Sharkipedia | open access database of shark and ray traits and trends

EDUCATION | New education initiatives in Seychelles | Sheena Talma

SMALL GRANT PROJECTS

ALFONSO GONZÁLEZ | California's cryptic angels

ALGHOZALI | Karimunjawa – the last hope for Java's giants?

BORTOLUZZI | Baby blues? Female blue sharks in Irish waters

CAVE | Coping with climate: is it in the genes?

CHAPUIS | The ghost of oceans future

CONCHA | The elephant in the room: are two populations actually one?

CRISTIANI | Forecasting the future: pollution and sharks

DE LA HOZ SCHILLING | Taxonomy and phylogeny of sharks and rays in Mauritania

GARCÍA-RODRÍGUEZ | Kelp! Important ocean forests for sharks

GONZALEZ | The same but different? Clarifying the origin of bonnethead sharks in Panama

GUIRY | Clues from the past to guide the future

HERRERA | Home sweet home for Colombian hammerheads

HOLST | Sevengill sharks in San Francisco Bay

HOSSAIN | Hammerheads of the Bay of Bengal

HUERTA BELTRAN | Guitarfish in Mexico's medicinal markets

JIMÉNEZ-PÉREZ | Shedding light: assessing LAMP to identify sharks in Mexico's trade

KELLER | Not just a fad: protecting silky sharks in fishing hotspots

LUBITZ | Coming home: movement patterns of Australia's bull sharks

MAHAN | Forever young: new ways to age sharks

NEVES | Going viral: understanding viral RNA diversity in sharks

OLADIPO | Pinpointing new information for Nigeria's pincushion ray

SIMEON | A new way to find white shark numbers

TRIPP-VALDEZ | Gut feeling: the impact of heavy metals on shark microbiomes

WAKHIDA | Searching for sawfish in Indonesian seas

KEYSTONE PROJECTS | CONTINUATION

BOOTH | Solutions for shark fisheries in a surfers' paradise

BRITTAIN | Building future conservation leaders in The Bahamas

CHAPMAN | Rapid DNA testing gives hope for 'rhino rays' in Hong Kong

CHIN | Searching for the river sharks and rays of Borneo

DOHERTY | Protecting the threatened sharks and rays of the Republic of Congo

DOWNING | Holding onto hope: long-term coral reef monitoring in southern Seychelles

ESPIÑOZA | Conservation strategies for hammerhead shark nurseries in the Galápagos Marine Reserve

GRAÇA ARANHA | Can deep-sea sharks survive – and thrive – in fishing grounds?

GRAHAM | Gill Guardians: an elasmobranch conservation and education hub

GREEN | Secrets of the whale sharks of the Galápagos Marine Reserve

HAQUE | Protecting 'rhino rays' in the world's largest bay

HART | Disentangling the drivers of Antarctic Peninsula penguin colony declines

HOOD | Mediterranean guitarfishes: addressing fisheries pressure and market demand

JONES | A genetic tool to help monitor sharks and skates in the north-eastern Atlantic

KINGON | Community-supported conservation goals for scalloped hammerhead

KISZKA | The importance of Seychelles for blue whales, and other whales and dolphins

KYNE | The clown wedgefish: no laughing matter

MACDONALD | Community conservation in the Caribbean

MORTIMER | Community monitoring of nesting sea turtles at D'Arros island and St Joseph Atoll, Seychelles

PUTRA | 'Rhino ray' conservation in Indonesia

QUEIROZ | Satellite tracking shortfin mako sharks in the South Atlantic

RUBIO | Linking local knowledge and local hearts to save the sharks of Holbox Island

SALINAS DE LEÓN | Protecting the sharkiest place on earth

TAKOUKAM KAMLA | Combining community and genetics for conservation in Cameroon

VEL | Environmental education in Seychelles

KEYSTONE PROJECTS | NEW

AMEPOU | Keeping watch on winghead sharks in Papua New Guinea

BESSUDO | Documenting biodiversity in Colombia's Malpelo MPA

CROCKETT | Shark Conservation Fund

FASSBENDER | The right reefs for sharks

FONTES | The sea's sheepdogs: tuna and whale shark feeding associations in the Azores

FOSTER & LANDSCHOFF | 1001 Seaforest species

SOSF OCEAN STORYTELLING GRANTS

SOSF Ocean Storytelling Grant | Photography | Acacia Johnson

SOSF Ocean Storytelling Grant | Photography | Gabriella Angotti-Jones

SOSF Ocean Storytelling Grant | Photography | Shane Gross

SOSF Ocean Storytelling Grant | Photography | Sarang Naik

SPECIAL GRANT

Shark and coral research in Seychelles by Marine Conservation International | Rupert Ormond



After many months of virtual meetings, being able to reconnect in person is a joyous occasion. In October 2022, the scientific committee met in Valencia, Spain, to review the grant applications for 2022 and make their final selection. From left to right: Sandrine Griffiths, Dean Grubbs, James Lea, Sarah Fowler and Andrew Chin.



CREDITS

Published by the Save Our Seas Foundation (SOSF)

Registered address:
Rue François Bellot 6, 1206 Geneva, Switzerland
Mailing and office address:
Rue Philippe-Plantamour 20, 1201 Geneva, Switzerland
SaveOurSeas.com

Editorial team: Lauren De Vos, Sandrine Griffiths, Aurélie Grosperon,
Isla Hodgson, James Lea, Jade Schultz
Book design: Thom design studio

Copy editing & proofreading: Leni Martin

Portraits: Sam Kerr

Jannes Landschoff: Cover, back cover, 113. Pelayo Salinas de León: 2, 40, 109. Travis Dukta: 9. Matthew Smukall: 4, 8, 46-51. Simon Hilbourne: 6. Danel Wentzel: 9 (below). James Lea: 10. Dillys Pouponeau: 11, 20 (below), 22, 25, 42. Tommy Schultz: 14. Gonzalo Araujo: 15. MantaCam: 19. Chris Rasta: 20 (top). Henriette Grimmel: 21, 23 (right). Nico Fassbender: 23 (left). Jamy Silver | © Save Our Seas Foundation: 24 (infographic). SOSF-Shark Education Centre: 26. Frances Weiner | © Save Our Seas Foundation: 28. Danel Wentzel: 28, 29, 30, 31, 32, 33. Justin Gilligan: 34. SOSF-Shark Research Center: 36, 37, 39. Sandrine Griffiths: 38, 39 (left), 126. Chelle Blais: 44. Sebastian Staines: 52. Jasmine Corbett: 55-58. Sarah Waries: 60, 64, 65-67. Shark Spotters: 62, 63. Janie Wray: 68, 75. Grace Baer: 69-74. Taryn Murray: 76. Helen Walne: 79, 82, 83. Daniel Fildes: 80. Massiel Alfonso González: 86. Faqih Alghozali: 86. Eloise Cave: 87. Lucille Chapuis: 88. Francisco J. Concha: 88 (right). Marco Cristiani: 89 (left). Carolina de la Hoz Schilling: 89. Emiliano Garcia: 90. Cindy Gonzalez: 90. University of California, Berkeley Bancroft: 91 (left). Emilio Posada: 91 (right). Meghan Holst: 92. Fayed M Khan: 92 (right). Bryan Huerta: 93. Alexis Jiménez-Pérez: 93. Annie Guttridge: 94. Jason Savage: 94 (right). Brandon Mahan: 95. Fabiana Neves: 95. Ajayi Bolanle: 96. Anna Simeon: 96. Miguel Tripp-Valdez: 97. Yunita Wakhida: 97. Hollie Booth: 98. Candice Brittain: 98. Demian Chapman: 99. Ifemelia Yudhis Tandia: 99 (right). Phil Doherty: 100. Nigel Downing: 100. Diego Bermeo: 101 (right). João Rodrigues: 101 (left). Jasmin Graham: 102. Simon J Pierce: 102 (right). Fayed Masud Khan: 103 (left). Carole Hall: 103. shutterstock ©: 104. Catherine Jones: 104. Kelly Kingon: 105. Jeremy Kiszka: 105. Tirta Anri Yadi: 106. Catherine Macdonald: 106. Jeanne Mortimer: 107. Een Irawan Putra: 107 (right). Nuno Queiroz: 108. Nadia Rubio: 108. Simon Hilbourne: 109 (right). Terence Vel: 110. Yolarnie Amepou: 110. Sandra Bessudo: 111. Stan Shea: 111 (right). Nico Fassbender: 112. Jorge Fontes: 112. Robert Bullock: 113 (left). Shane Gross: 114, 117. Acacia Johnson: 115, 116. Gabriella Angotti-Jones: 116. Sarang Naik: 117. Thien Nguyen Ngoc: 118. Leah Rolando, Wavescape: 119, 122. Sharks International 2022: 120, 121. Jon Craig: 123. Sally Snow: 124 (left), 143. Fabrice Chapuis: 124 (right). Muto: 125. Juan Antonio Romero: 142.

Printed by: Polygravia, 1618 Châtel-St-Denis, Switzerland

To keep up to date with our activities,
follow the Save Our Seas Foundation on
Web | saveourseas.com
Instagram | [@saveourseasfoundation](https://www.instagram.com/saveourseasfoundation)
Facebook | [Facebook.com/saveourseasngo](https://www.facebook.com/saveourseasngo)
Twitter | [@saveourseas](https://twitter.com/saveourseas)



save our seas
foundation