SAVE OUR SEAS FOUNDATION

ANNUAL REPORT 2021

save our seas foundation

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

THE FOUNDER | SAVE OUR SEAS FOUNDATION

'Yasha', a hawksbill turtle that has become well known in Seychelles after being raised illegally in captivity, is finally released in a sea-grass bed at St Joseph Atoll.

CONTENTS

Support for emerging scientists and young conservation leaders has never been more urgent or important. The challenges of 2020 brought even greater determination to our projects' efforts in 2021.

CEO'S FOREWORD

Wow, another year already! It feels as though the pandemic has caused a strange distortion in time. Somehow, despite persisting restrictions that help stretch and merge days, it seems only a mere moment since I wrote about the challenges of 2020. But as I now reflect to write about the activities of 2021, I'm quite honestly astonished to peer back through the blur and be reminded of just how much has been achieved in these past 12 months.

In 2021 we funded a record 61 projects across all seven continents. And, without fail, we are humbled by the tireless dedication of our project leaders and their constant striving to make a difference despite facing the additional challenges of a pandemic.

From walking sharks to Antarctic penguins, this year we have supported an especially diverse range of projects. Carolyn Wheeler is investigating how climate change may affect the reproductive success of the epaulette shark in Australia (this fascinating species can haul itself over the reef to 'walk' between tidal pools!). In the Antarctic, Tom Hart is using the unexpected absence of tourists to disentangle the impacts of fishing, climate change and tourism on the local penguin populations. Other projects focused on overfishing, the key threat to shark and ray populations, and included exploring how mako sharks interact with Atlantic fisheries; recording shark landings using citizen science in Cameroon; and documenting the cultural history of shark fishing in south-eastern Mexico.

Above: Expanding protection for sharks and understanding how our current efforts impact their populations – and the people whose lives depend on them – is the subject of several grantees' work.

Above right: The epaulette shark is intriguing for more than its unique ability to use its pectoral fins for 'walking'. It is being studied to understand what the impact of our warming oceans will be on shark reproduction.

Opposite: At the Southern African Shark and Ray Symposium, one of the first in-person conferences after Covid-19 restrictions were lifted, the sense of camaraderie delegates experienced was cause for welcome celebration.

This year also saw the return of in-person conferences and we supported and attended both the European Elasmobranch Association meeting in the Netherlands and the Southern African Shark and Ray Symposium in Gansbaai, South Africa. It was a surreal experience after such prolonged isolation, but there was an overwhelming feeling of celebration at the return of human connection to the sharing of ideas and a passion for sharks and rays.

Our three centres have also been gearing up since the pressures of the pandemic have started to ease. In Seychelles we established a new team at our D'Arros Research Centre and brought in research assistants Ellie Moulinie and Dillys Pouponeau. Combined with the launch of research internships with UniSey, we have been able to expand the scope of our work and build capacity in a talented new generation of Seychellois marine scientists.

Meanwhile, our Shark Education Centre in South Africa has continued to adapt, taking its programmes out to schools when restrictions limited schools coming to it. In addition, the centre's outdoor spaces have been redesigned to give visitors the sense of moving from the shore through kelp forest and out into the open ocean.

Our Shark Research Center in Florida has advanced its world-leading genetics work, which includes deep dives into shark genomes and deciphering genetically distinct populations of the same species.

All of this tells us what we need to do, but it's the meaningful communication of science that makes us want to make a difference. This is why we have redoubled our efforts to communicate science and a love of the ocean in an accessible and engaging way. We launched a new hub of articles and fun facts

Opposite: The dramatic landscape of the Cocos Islands sets the scene for the outstanding value of the Eastern Tropical Pacific, where many 2021 grantees work.

Left above: The Antarctic Peninsula's penguins are climate 'canaries in the coalmine'. Monitoring their populations during the pandemic is an opportunity to test what is driving their declines.

Left below: One of the challenges the pandemic has set is to reach new and large audiences. To achieve this, the *Save Our Seas* magazine shares conservation stories illustrated with compelling imagery.

about sharks on our website. Called 'World of Sharks', it aims to provide interesting and accurate content on popular topics. We also published the 11th issue of our magazine *Save Our Seas*, which features stories on sharks and marine conservation that we hope will appeal to a general audience. We have collaborated on exhibitions and art installations such as the 'Shark Alley' exhibit at the Two Oceans Aquarium in Cape Town, the marine-themed photo festival ExpoSub in Switzerland and a vibrant shark-themed mural at the Sea Walls Santa Cruz festival in California.

So wow, another year. Another year spent fostering hope for sharks and rays and working towards their recovery and the stabilisation of their populations. Another year spent celebrating the natural wonder of these enigmatic creatures. While great challenges remain, I have even greater optimism as we move into our 20th year that we can do more than just slow down declines in shark numbers. Indeed, I have hope that we can start turning the narrative into one of recovery.

Dr James Lea
Chief Executive Officer

18 YEARS OF THE SAVE OUR SEAS FOUNDATION

RESEARCH EDUCATION CONSERVATION

SINCE ITS INCEPTION IN 2003, THE SAVE OUR SEAS FOUNDATION HAS FUNDED MORE THAN **400 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

D'ARROS ISLAND, SEYCHELLES
SOSF D'Arros Research Centre
Showcasing the ecological diversity and importance of D'Arros and St Joseph, with 22 targeted projects and six long-term monitoring programmes to date.

CAPE TOWN, SOUTH AFRICA
SOSF Shark Education Centre
Engaging local communities in marine conservation.

DANIA BEACH, USA
SOSF Shark Research Center
World-leading genetics laboratory, sequencing the first white shark genome in 2019.

5 long-term partners

BAHAMAS
Bimini Biological Field Station Foundation

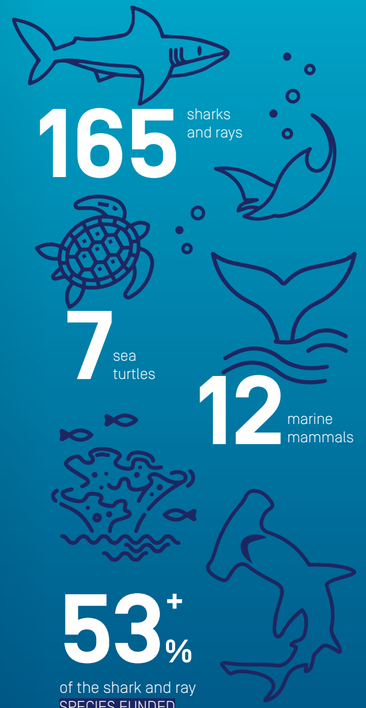
UK
The Manta Trust

SOUTH AFRICA
Shark Spotters

CANADA
North Coast Cetacean Society

SOUTH AFRICA
The Acoustic Tracking Array Platform

Species funded



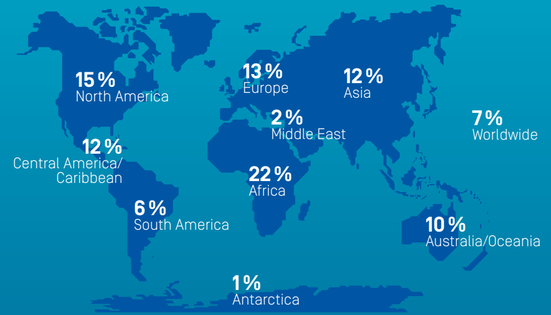
165 sharks and rays

7 sea turtles

12 marine mammals

53+% of the shark and ray SPECIES FUNDED can be considered VULNERABLE TO EXTINCTION.

400~ projects in 85 countries



61 projects in 2021

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

30 years old

Average age of early career professionals supported by Small Grants.

Grant recipients
49.5% women
50.5% men

WHERE WE WORK 2021

The Save Our Seas Foundation was established in 2003 with a mission to protect our oceans by funding and supporting research, conservation and education projects around the world, focusing primarily on charismatic threatened wildlife and their habitats.

62 63 64
WORLDWIDE

AFRICA

CAMEROON
1 Citizen science shark conservation, Aristide Takoukam Kamla
2 Baseline sharks and rays, Lionel Yamb

CAPE VERDE
3 Blackfin guitarfish conservation, Kirsti Ann Burnett

REPUBLIC OF CONGO
4 Shark and ray protection, Phil Doherty

SEYCHELLES
5 SOSF D'Arros Research Centre
6 Coral community monitoring, Nigel Downing
7 Seychelles cetaceans, Jeremy Kiszka
8 Turtle monitoring, Jeanne Mortimer
9 Environmental education, Terence Vel

SOUTH AFRICA
10 SOSF Shark Education Centre
11 The Acoustic Tracking Array Platform, Paul Cowley
12 Shark Spotters, Sarah Waries

AMERICAS

BRAZIL
13 Amphi-American guitarfish, Fernanda Rocha

CANADA
14 The North Coast Cetacean Society, Janie Wray

COLOMBIA
15 Largetooth sawfish protection, Fabio Cuello

COSTA RICA
16 MPAs for sharks, Randall Arauz

ECUADOR
17 Hammerhead shark nursery, Eduardo Espinoza
18 Whale shark migrations, Jonathan Green
19 Marine education, Juan Torres

MEXICO
20 Revillagigedo National Park protection, Alejandro Gonzalez
21 Coastal fishers' shark tales, Ilse Alejandra Martinez
22 Local knowledge and education, Nadia Rubio

PATAGONIA
23 Sharks, salmon and aquaculture, Joaquín Soto

PERU
24 Smooth hammerhead nursery areas, Eduardo Segura
25 Guitarfish catch and bycatch, Elizabeth Gutierrez Llanos

PUERTO RICO
26 Deep-sea shark fisheries, Glorimar Franqui-Rivera

THE BAHAMAS
27 Education outreach, Candice Brittain
28 Smalltooth sawfish life history, Dean Grubbs
29 Bimini Biological Field Station (Shark Lab), Matthew Smukall

TRINIDAD
30 Scalloped hammerhead community conservation, Kelly Kingon

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33 Cownose ray movement patterns, Ashley Mackenzie Dawdy
34 Pacific sleeper shark conservation, Michael Wang
35 Shifting attitudes and values, Julia Wester
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37 Monitoring Antarctic Peninsula penguins, Tom Hart

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BANGLADESH
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BORNEO
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HONG KONG
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INDIA
41 Deep-sea gulper sharks, Ebeena Francis

INDONESIA
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43 Clown wedgefish ground-truthing, Peter Kyne
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MALAYSIA
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MALDIVES
46 Whale sharks and microplastics, Alina Wieczorek

PHILIPPINES
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GREECE
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IRELAND
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55 Deep-sea shark fishing grounds, Sofia Graca Aranha

SAINT HELENA
56 Shortfin mako satellite tracking, Nuno Queiroz

SCOTLAND
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58 Kinship in spurdog aggregations, Fenella Wood

OCEANIA

AUSTRALIA
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PAPUA NEW GUINEA
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OUR CENTRES

REPORTS FROM THE SAVE OUR SEAS FOUNDATION CENTRES AROUND THE WORLD

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

A juvenile green turtle at the reef's edge makes its way into deeper water.

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 these small islands of the Amirantes Group in Seychelles.

The year began with the arrival of the centre directors, Henriette Grimmel and Robert Bullock, on D'Arros in January. In April they were joined by Ellie Mouliniè and Stana Mousbe, Ellie as a research assistant while Stana stayed for a four-month research traineeship. In September the arrival of another research assistant, Dillys Pouponeau, completed the team.

Long-term monitoring projects are at the core of the SOSF-DRC's activities and in 2021 data collection continued for key long-term programmes, although several new projects were also initiated. Daily monitoring of nesting activity in both green and hawksbill turtles continues to contribute to a better understanding of how these threatened animals use the islands. D'Arros and St Joseph form an important aggregation area for reef manta rays and the team monitors the individuals using the site by conducting weekly boat surveys and almost continuously deploying an underwater monitoring station. The large acoustic receiver array continues to collect important movement and habitat-use data

and over the year several downloads were completed across the array. The team has also now undertaken a long-term mark-recapture project for juveniles of four shark and ray species in St Joseph Atoll. In addition, it has begun an annual census of the breeding wedgetail shearwater population and set up several pilot sites to trial mangrove restoration techniques. During the year, the collection of genetic samples from green and hawksbill turtles contributed to several broader regional collaborations to advance understanding of the Indian Ocean's turtle populations.

Supporting student research projects is an important part of the centre's mission. Two Seychellois Bachelor's students, Sarah Purvis and Saratha Naiken, studying at Plymouth University in the UK and University of Seychelles respectively, are now working with the centre. Sarah is using long-term reef fish survey data to investigate the impacts of large-scale ocean warming events on reef fish community structure. Saratha is using mark-recapture data to investigate factors influencing body condition in two juvenile shark populations.

Each year the centre supports visiting researchers in collecting data that contribute to broader projects. Two research teams visited D'Arros in 2021. The first, a team from the Max Planck Institute for Chemistry in Germany, arrived in October and stayed for two weeks to collect cores from *Porites* corals. The team uses the cores to examine how these corals have stored nitrogen over time, which is helping to reveal more about past and future climate change. Twelve cores were collected over the two weeks and safely returned to Germany for analysis. In December, a research team from Oxford University in the UK, working as part of a broader collaboration and joined by Dr Jeanne Mortimer, arrived on D'Arros. The project, headed by Oxford University and Seychelles Conservation and Climate Adaptation Trust (SeyCCAT), aims to map sea-grass cover across Seychelles, thereby quantifying the carbon sequestration value of this resource across the nation. The objective of the trip was to map the sea-grass areas around D'Arros and St Joseph and to collect sediment samples from various shallow-water sites.

Sarah is using long-term reef fish survey data to investigate the impacts of large-scale ocean warming events on reef fish community structure.

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

Below: SOSF–DRC trainee Stana Mousbe collects environmental data during field work in the atoll.

Opposite: The SOSF–DRC team in its constellation of mid-2021.

Several SOSF-associated scientists also made trips to D'Arros in 2021. Dr Jeanne Mortimer, the beating heart of turtle research in Seychelles, came over to provide training in turtle tagging and sampling methods. SOSF project leader Terence Vel made the trip to D'Arros to guide plans for forest rehabilitation and provide expertise on mangrove restoration.

Over the course of 2021 various SOSF-DRC associated research articles were published in scientific journals. These studies include the investigation of ontogenetic shift in habitat use and home range of giant trevally (Daly et al. 2021), the residency and habitat use patterns of three dasyatidae ray species using the St Joseph Atoll (Elston et al. 2021), the drivers of activity patterns in sicklefin lemon sharks (Byrnes et al. 2021) and a report of a novel record of a marine isopod for the region (Bullock & Grimmel 2021).

Previous page: A school of blue-striped snappers in the shallows off D'Arros Island.

Below: SOSF Seychelles Ambassador Terence Vel discusses mangrove propagules with the team.

Bottom: The team's field kayak is loaded with equipment for the work that will be carried out on juvenile sharks at St Joseph Atoll.

Opposite: The SOSF-DRC team with Aldabra giant tortoise 'Thomas' as well as student intern Saratha Naiken and trainee Stana Mousbe on the day of the latter's departure.

RESEARCH PAPERS ASSOCIATED WITH THE SOSF-DRC PUBLISHED IN 2021

Daly R, Filmalter JD, Peel LR, Mann BQ, Lea JSE, Clarke CR and Cowley PD. Ontogenetic shifts in home range size of a top predatory reef-associated fish (*Caranx ignobilis*): implications for conservation. *Marine Ecology Progress Series* 664, 165–182.

Elston C, Cowley PD, Von Brandis RG and Lea JSE. Residency and habitat use patterns by sympatric stingrays at a remote atoll in the Western Indian Ocean. *Marine Ecology Progress Series* 662, 97–114.

Byrnes EE, Daly R, Leos-Barajas V, Langrock R and Gleiss AC. Evaluating the constraints governing activity patterns of a coastal marine top predator. *Marine Biology* 168, 1–15.

Bullock RW and Grimmel HMV. First Record of the Cymothoid Isopod *Nerocila exocoeti* Pillai, 1954 (Crustacea, Isopoda) in the South-West Indian Ocean and First Record of a Perciform Host, *Echeneis naucrates,* for this Species. *Acta Parasitologica* 66, 1593–1596.

Research assistant Ellie Moulinie encountered a manta mating train at D'Arros in September.

This year also saw the introduction of an exciting education programme. The 'D'Arros Experience' brings Seychelles school students to D'Arros to learn at first hand about nature and the environment and its conservation. An independently judged competition was launched in September, for which students were asked to invent a superhero to tackle marine conservation issues and present them as a story or poster. The 16 winning applicants from this year's competition should head to D'Arros next year as the first groups of students to explore the island's biodiversity and learn about the importance of understanding and protecting these national resources.

The centre has achieved a lot over the past year and moving ahead aims to continue contributing to valuable science, both to further its capacity-building and educational outreach in Seychelles and to build successful collaborations with national and international entities.

Looking ahead to 2022, the centre is committed to continuing to support marine conservation through innovative research projects. New keystone project leader Nico Fassbender will begin his PhD research on D'Arros in 2022, investigating the relationship between habitat complexity and space use in different species of reef shark. The DRC team will explore how drones can be used to better understand the population dynamics and movements of different species using the St Joseph Atoll.

The SOSF-DRC continues to invest in the future protection of the islands and is now committed to a long-term partnership with SeyCCAT whereby D'Arros and St Joseph will be one of four locations to trial template management plans for the new marine protected area network, under which D'Arros and St Joseph were formally gazetted in 2020. This will see a trial implementation phase of site-specific plans coming into effect from June 2022.

Youngsters are rejuvenated after a Marine Explorers after-school snorkelling session.

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 to 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 a class all about sharks, while exploring the Dalebrook rock pools or even during a guided tour of the facility. The ultimate aim is to inspire a sense of guardianship and a desire to conserve the marine environment.

EDUCATIONAL IMPACT

In 2021, the SOSF-SEC followed a four-pronged educational approach. This consisted of the following: school group lessons conducted on- and off-site; guided tours of the centre; the production of educational materials; and the continuation and development of several long-term programmes.

Opposite: A puffadder shyshark rests on the sand in False Bay.

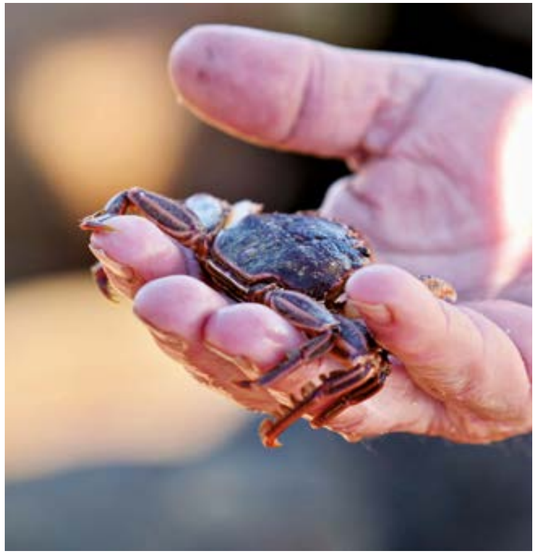
Above left: Shark Education Centre staff discuss marine ecosystems with a class of Grade 8 learners from Crestway Secondary School.

Above right: A group of Grade 3 learners at Westlake Primary School, along with the director of the Save Our Seas Foundation, dance to the song 'Baby shark'.

In total, we reached 1,653 learners during off-site lessons.

As the Covid-19 pandemic continued throughout 2021, the SOSF-SEC adjusted to the new way of life it imposed. The centre's target audiences are primary and secondary schools in under-resourced communities, which were hit particularly hard by Covid-19. The pandemic highlighted inequalities in the South African education system as government schools could not simply move their content to online platforms and had limited capacity to adapt educational materials. In addition, restrictions prohibited government schools from outings for most of 2021. As a result of these challenges, the education team visited the schools to teach lessons. These classes were very popular, with high learner engagement and good feedback from the schools. In addition, the SOSF-SEC provided learners with a healthy snack to boost energy and aid the learning process. In total, we reached 1,653 learners during off-site lessons. This flexible approach enabled us to form partnerships with new schools and we hope these will continue to flourish in future years.

The Covid-19-compliant guided tours were a big success during 2021, with 684 visitors booking customised guided tours.



Searching for rocky shore treasures.

The Shark Education Centre's Ocean Ambassador programme engages children in learning about the marine environment from an early age.

Luckily, private schools and informal groups could still visit the SOSF-SEC as they do not need to comply with government school regulations. These groups experienced a morning of engaging lessons and activities, explored the wonderful displays and touch tank and visited the rock pools opposite the centre when tides permitted. A total of 489 learners enjoyed the full experience that the SOSF-SEC can offer.

The Covid-19-compliant guided tours were a big success during 2021, with 684 visitors booking customised guided tours. These tours focused on small groups of visitors and offered unique interactions and age-appropriate interpretation of the various exhibits.

In 2021 the SOSF-SEC printed and distributed the activity books that had been finalised the previous year. We produced two books aimed at different age groups and included many activities and brain-teasers to encourage learning. These colourful take-home materials allowed the education to continue following a SOSF-SEC lesson. Learners could also share them with family and friends to expand the reach of classes.

The SOSF-SEC's long-term snorkelling programme (Marine Explorers) continued in 2021, with two groups of learners (in total, 21) completing the programme. In the first half of the year we partnered with EcoActive Sport (an NGO with learn-to-swim programmes), with whom we had partnered in 2019 and 2020. Then in the second half of the year, the SOSF-SEC developed a new partnership with the Lawhill Maritime Centre at Simon's Town School. Both groups comprised secondary schoolchildren who demonstrated swimming proficiency and an interest in the ocean. These were a huge success, and it was wonderful to see the participants' confidence and appreciation for the ocean developing during the year.

2021 saw the pilot launch of our Ocean Ambassador programme that aims to reach new audiences in under-resourced communities. The programme involves identifying key individuals living in these communities and offering them training to share information and engage their peers in ocean conservation effectively. During the programme, we encourage the ambassadors to organise events (such as beach clean-ups or talks) within their community. Our first ambassador successfully organised two clean-ups in 2021, with more than 50 participants and many bags of litter collected.

To grow as an educational entity and connect with other like-minded organisations, we have been working on our collaborations during 2021. During March, the SOSF-SEC partnered with the Shark Spotters to host a 'Shark Smart Swim' to raise awareness about the shark species in False Bay. This day involved a sponsored swim of the Fish Hoek shark net, several educational activities and a shark sand sculpture competition. Throughout the year, our staff actively engaged in developing content for the Two Oceans Aquarium's Save Our Seas Foundation Predator Exhibit and Shark Alley, with the official launch of the exhibit in October. Another event that we partnered with this year was the inaugural Deli-to-sea, an ocean-awareness run hosted by the Good Machine to raise funds for the Beach Co-op, a local beach-cleaning initiative. The SOSF-SEC also sponsored a large shark-inspired mural on Dalebrook beach as part of this event.

The biannual Southern African Shark & Ray Symposium took place in Gansbaai in 2021. The education team was fortunate to attend this event, where scientists shared their latest findings, and we formed new connections with like-minded individuals and organisations. Clova was a member of the conference scientific committee and also led an informative science communication workshop filled with practical tips to improve the ways science can be shared with non-academics.

Shark games were played at the SOSF-SEC gazebo during one of our 2021 beach events.

Above left: A competition to create the best shark sand sculptures was one of the popular activities at the Shark Smart Swim co-hosted by the SOSF-SEC and Shark Spotters.

Above right: One of the young winners of the competition proudly shows off his dark shyshark decorated with kelp.

Above: Shark Education Centre and Shark Spotters staff work together to tally laps for the Shark Smart Swim.

Opposite left: Learners find out about sea stars as they explore the rocky shore at Dalebrook.

Opposite right: A Marine Explorer from EcoActive found a newly hatched shark egg case while snorkelling.

For the second year running, the SOSF-SEC has invited a student from the Cape Peninsula University of Technology to join the education team as part of a four-month work-integrated learning programme. In addition, we offered several job shadow opportunities to secondary school students who demonstrated aptitude and an interest in studying marine biology after matriculating.

LOOKING FORWARD

Despite hopes that 2021 would signal a return to 'normal', this was unfortunately not the case. However, the team at the SOSF-SEC remained positive and made the most of the situation with a flexible approach.

The SOSF-SEC will implement a newly developed science communication strategy during 2022. This strategy will involve the SOSF-SEC increasing its educational reach in the current programmes and introducing several new projects. We will market the SOSF-SEC to new schools and improve existing relationships with schools in target communities. In addition, we hope to launch various after-school activities in the following year, including an after-school sea scout club and a programme for previous Marine Explorer cohorts.

The head of a shortfin mako, illustrating its impressively streamlined shape and large eyes. This shark is the centrepiece of the SOSF Shark Research Center's logo.

save our seas
shark research center

MAHMOOD SHIVJI

SOSF SHARK RESEARCH CENTER

DR MAHMOOD SHIVJI

The SOSF-SRC uses a multi-disciplinary approach to its research programme, employing methods from genetics and genomics to ecology. This operational strategy is based on our philosophy that a holistic understanding of the animals, their environment and their interaction with anthropogenic influences is necessary for science-based conservation.

In 2021, the SOSF-SRC continued its globally widespread research on sharks of several species in three core research disciplines:

- Decoding entire genomes of sharks to obtain a highly detailed view of the genetic basis underlying the biological traits and ecological functioning of these extraordinary, and in many cases endangered, animals.
- Determining the population genetic/genomic dynamics and stock structure to aid conservation management of several large-bodied species of exploited sharks.
- Investigating the movement ecology of shark species of conservation concern.

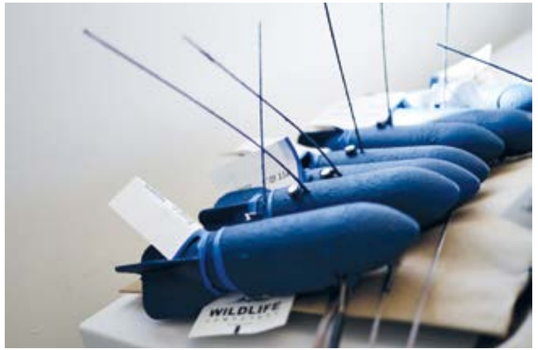
The great hammerhead shark is a Critically Endangered species whose entire genome sequence is being deciphered by the SOSF Shark Research Center and collaborators.

DECODING SHARK GENOMES

- We have now produced a high-quality, chromosomal-scale assembly of the entire genome of the great hammerhead shark (IUCN Critically Endangered). The chromosomal-scale assembly was accomplished by combining Illumina sequencing platform-generated short sequence reads and PacBio platform-generated long read genome sequences, with the addition of Hi-C genome proximity ligation data, allowing the creation of highly connected DNA sequences over long distances to produce what is known as a chromosomal-level reference genome assembly. The next key step, genome annotation (i.e., the prediction of genes and other functional units in the assembled genome), utilising great hammerhead individual tissue transcriptome sequence reads, is ongoing.
- We have produced a draft-quality assembly of the genome of the shortfin mako shark (IUCN Endangered). This draft assembly is based on combining short read and long read mako genome sequence data (see methods above). The draft assembly is currently undergoing improvement by a recently developed proximity ligation tool known as Omni-C (https://dovetailgenomics.com/wp-content/uploads/2019/08/Omni-C_TechNote.pdf). This new scaffolding tool is expected to vastly improve the quality of the mako genome assembly, allowing not only production of a chromosomal-scale reference assembly, but also greatly improved subsequent gene annotation to reveal detailed knowledge of the structure of individual genes and proteins in mako sharks.

The availability of these high-quality genome assemblies will provide a reference for use by the worldwide science community to better understand the biology of these endangered sharks and devise improved conservation measures for them based on the most up-to-date biological information.

Such genetic adaptations – and the diversity associated with them – are critical for providing species with the evolutionary resilience to survive changes in the environment.



Opposite: (Left to right) Dr Jeremy Vaudo, Marissa Mehlrose and Prof. Mahmood Shivji of the SOSF Shark Research Center.

Left: The scalloped hammerhead shark is a Critically Endangered species worldwide.

Above: Satellite tags used to study the migration patterns of Critically Endangered scalloped hammerhead sharks.

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

We continued work using genetics and genomics approaches to identify genetically distinct populations/stocks and levels of genetic diversity in four species of large-bodied apex predator sharks that are globally exploited and of high conservation concern: tiger shark (IUCN Near Threatened), scalloped hammerhead shark (IUCN Critically Endangered), great hammerhead shark (IUCN Critically Endangered) and shortfin mako shark (IUCN Endangered). Knowledge of the population-level genetic dynamics of exploited shark species is essential because individual populations living in different geographic regions can become adapted at the DNA level to their specific environments. Such genetic adaptations – and the diversity associated with them – are critical for providing species with the evolutionary resilience to survive changes in the environment, thus providing a bulwark against extinction. The identification of such regionally adapted populations is urgent so that conservation management can be targeted to cope with high levels of overfishing and the rapid changes that are occurring in the earth's climate and oceanic ecosystems.

To this end, in 2021:

- We completed the study on the population genomic dynamics of tiger sharks on a global scale. This research was published in the *Journal of Heredity* (https://academic.oup.com/jhered/article-abstract/112/6/497/6347518) and given the journal cover (provided by the SOSF). This is the first genomics-scale population perspective for this charismatic species. The data show that despite the highly migratory nature of tiger sharks, there exists a large genetic divergence between those from the Atlantic and those from the Indo-Pacific and notably, a strong signal of evolutionary genetic adaptation of tiger sharks to each oceanic region. This finding makes it imperative that tiger sharks in each oceanic region receive targeted management to preserve their evolutionary uniqueness and potential. This research received coverage in several media outlets, with mention of the SOSF-SRC brand.
- We continued genomics scale (nuclear and mitochondrial) data acquisition and analysis of shortfin mako shark populations throughout the Atlantic. We completed the development of SNP markers and have nearly finished the data analyses. We also completed the sequencing, assembly and annotation of whole mitochondrial genomes from 93 shortfin mako sharks sampled from the Atlantic northern and southern hemispheres. The combination of SNP and mitogenome data will provide a high-resolution view of the population structure and demography of the mako shark, a globally Endangered species that is overfished in the Atlantic. This population genetic information is of high international management interest. The mitogenome sequencing part of this project forms the Master's thesis of Marissa Mehlrose.

It [is] imperative that tiger sharks in each oceanic region receive targeted management to preserve their evolutionary uniqueness.

Above: The shortfin mako is a globally Endangered species.

Opposite: A juvenile tiger shark is measured and sampled for tissue that will be used in genetic analysis.

- We completed our study of the population genetic, phylogeography and mating systems of the Critically Endangered scalloped hammerhead shark in the Eastern Tropical Pacific. This project was a collaboration with Dr Pelayo Salinas de León of the Charles Darwin Foundation. It formed the Master's thesis of Sydney Harned (now graduated from Nova Southeastern University and currently in a PhD programme at North Carolina State University). A manuscript has been drafted and is undergoing review by co-authors before journal submission.
- We continued work on the global population structure of the great hammerhead shark utilising genomic markers (SNPs and whole mitogenomes). The genomics data have been collected. Data analysis is ongoing.

Above: The genetic background of scalloped hammerhead sharks throughout the Eastern Tropical Pacific is being studied.

Right: The silky shark, an open-ocean species, is one of the world's most highly fished sharks.

MOVEMENT ECOLOGY OF SHARKS

Successful conservation planning for populations of exploited shark species requires knowledge of their migration patterns and how they use their habitat. To this end, in 2021 the SOSF-SRC worked in collaboration with the Guy Harvey Research Institute (shared resources) to continue and extend our work (with Dr Pelayo Salinas de León) on the movement ecology of scalloped hammerhead sharks and silky sharks (IUCN Vulnerable) based in the Galápagos. In 2021, we deployed 39 SPOT tags and seven PAT tags on silky sharks and developed a publicly accessible tracking website for viewing the tracks (www.GHRITracking.org – Project 22). Notably, the satellite tracking data reveal that at least four of the 46 silky sharks have been captured by fishers.

SOSF-SRC SCIENTIFIC PAPERS PUBLISHED IN 2021

* Graduate student author
** Post-doc author

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Sort M, Manuzzi A, Jiménez Mena B, Ovenden JR, Holmes BJ, Bernard AM**, Shivji MS, Meldrup D, Bennett MB and Nielsen EE. Come together: Calibration of tiger shark (*Galeocerdo cuvier*) microsatellite databases for investigating global population structure and assignment of historical specimens. *Conservation Genetics Resources* 13: 209–220. https://doi.org/10.1007/s12686-021-01197-5

Cassandra Storo R*, Easson CG, Shivji M and Lopez JV. Microbiome analyses demonstrate specific communities within five shark species. *Frontiers in Microbiology* https://doi.org/10.3389/fmicb.2021.605285

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

Students and volunteers from the Bimini Biological Field Station Foundation snorkel above a great hammerhead shark at Bimini in The Bahamas.

MATTHEW SMUKALL

BIMINI BIOLOGICAL FIELD STATION FOUNDATION

MATTHEW SMUKALL

The Bimini Biological Field Station Foundation (BBFSF) was established in 1990 by Dr Samuel Gruber to advance our knowledge of elasmobranch fish fauna (sharks and rays); educate future scientists; and disseminate our research to advance the field of marine science and raise public awareness about sharks. This executive summary will serve as an update to our activities and highlight the accomplishments of the BBFSF in 2021.

RESEARCH

In 2021, the Commonwealth of The Bahamas passed the Access and Benefit Sharing legislation with the intention of ensuring that equitable benefits accrue to local communities from research activities. This legislation was intended to regulate commercial enterprises and economically valuable discoveries. However, the new regulations also dramatically impacted research activities for not-for-profit organisations and universities. Unfortunately, the new permitting process was accompanied by numerous delays, technical challenges and an uncertainty about policies. As a result, many research groups struggled with the new regulations and were unable to conduct research in The Bahamas during 2021. The BBFSF has been engaging with other research groups to facilitate an improved permitting system in The Bahamas. Initial efforts were

Opposite: An acoustic tracking transmitter is surgically implanted into a blacktip shark.

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

These movement data make up a final component of the BBFSF's multi-year research investigating the role of reproduction in the regional movements of the species.

rebuffed by governmental departments, but late in 2021 there was a change in government sentiment. In late November, after 11 months of effort, the BBFSF received a consolidated research permit that allowed us to achieve some of our goals. The outlook for 2022 is more optimistic and we hope that research efforts can resume in the near future.

VEMCO ACOUSTIC MONITORING ARRAY

The BBFSF Vemco acoustic array currently encompasses 65 receivers in habitats surrounding North and South Bimini islands and continues to provide valuable data for both BBFSF researchers and our collaborators. The Vemco array was downloaded and new batteries installed in December 2021. The data processing and analysis is ongoing. To date, 261 elasmobranchs have been tagged with Vemco transmitters, including five lemon, three blacktip, five Caribbean reef and four tiger sharks tagged in 2021. The reef sharks were tagged with Vemco V16 transmitters equipped with accelerometer and depth sensors. Data from these transmitters will be used to determine how tourism shark dive operations at a local dive site impact the activity levels of reef sharks and habitat use. Thanks to collaboration with the Shedd Aquarium and Florida State University, five tiger sharks were fitted with satellite transmitters. Three of these sharks were confirmed to be pregnant at the time of tagging. These movement data make up a final component of the BBFSF's multi-year research investigating the role of reproduction in the regional movements of the species.

Top: Students and volunteers snorkel with Caribbean reef sharks at a reef near Bimini.

Above: A student swims with a blacktip shark.

ABUNDANCE SURVEYS

Unfortunately, due to the change in the granting of research permission, several long-term research projects were unable to proceed in 2021. After 27 years, the annual lemon shark census in the Bimini lagoon (PIT project) was not authorised by the government. In addition, the longline survey, which has provided abundance indices for 35 years and is the longest-running survey in The Bahamas, was also not approved. The BBFSF will be petitioning to be authorised to resume these important surveys for 2022. In the interim, we have been using baited remote underwater video surveys (BRUVS) and catch-per-unit effort for block rigs as a proxy for assessing shark abundance.

EDUCATION

VOLUNTEER INTERNSHIPS

Despite the ongoing challenges of Covid-19 restrictions for international travel, we are able to resume a relatively 'normal' internship programme. Following rigorous Covid testing regimes, quarantines and vaccine protocols, we have been able to maintain a safe work and housing environment for the BBFSF crew. We welcomed 20 international interns to the station in 2021. This included two scholarship students from Minorities in Shark Science (MISS) and two students for the inaugural 'Doc Gruber' memorial scholarship. These two initiatives provide access to marine science for students from traditionally underserved demographic groups or with restricted financial means.

STUDENTS

Doctoral students Vital Heim and Clemency White have concluded their field work in Bimini. Unfortunately, the changes and delays with the permission processes in The Bahamas impacted their research during their final field season and they are both working on altering their dissertations in response to the delays. The BBFSF anticipated welcoming doctoral student Molly Kressler of Exeter University, but the permission issues have delayed this until 2022.

COURSES

In accordance with Covid safety regulations, visiting courses were cancelled for the first half of 2021. As global health conditions improved and vaccines became accessible, the BBFSF was able to safely welcome back visiting groups for the second half of the year. We hosted five visiting field expeditions, a naturalist course and a shark biology course from Florida Southern College. These field excursions and courses provide a platform for BBFSF staff and students to teach about our ongoing research and conservation initiatives.

Students and volunteers observe lemon sharks at a nursery site in the mangroves of the Bimini lagoon.

OUTREACH

During the global Covid pandemic, a large portion of our outreach and education programmes needed to adapt to social distancing and lockdown measures. These virtual systems have now endured as a means to broaden our outreach around the world. We continue to use social media (Instagram, Facebook and Twitter) as platforms to disseminate our research and conservation messages. Virtual meetings now allow us to engage with classrooms and seminars around the world.

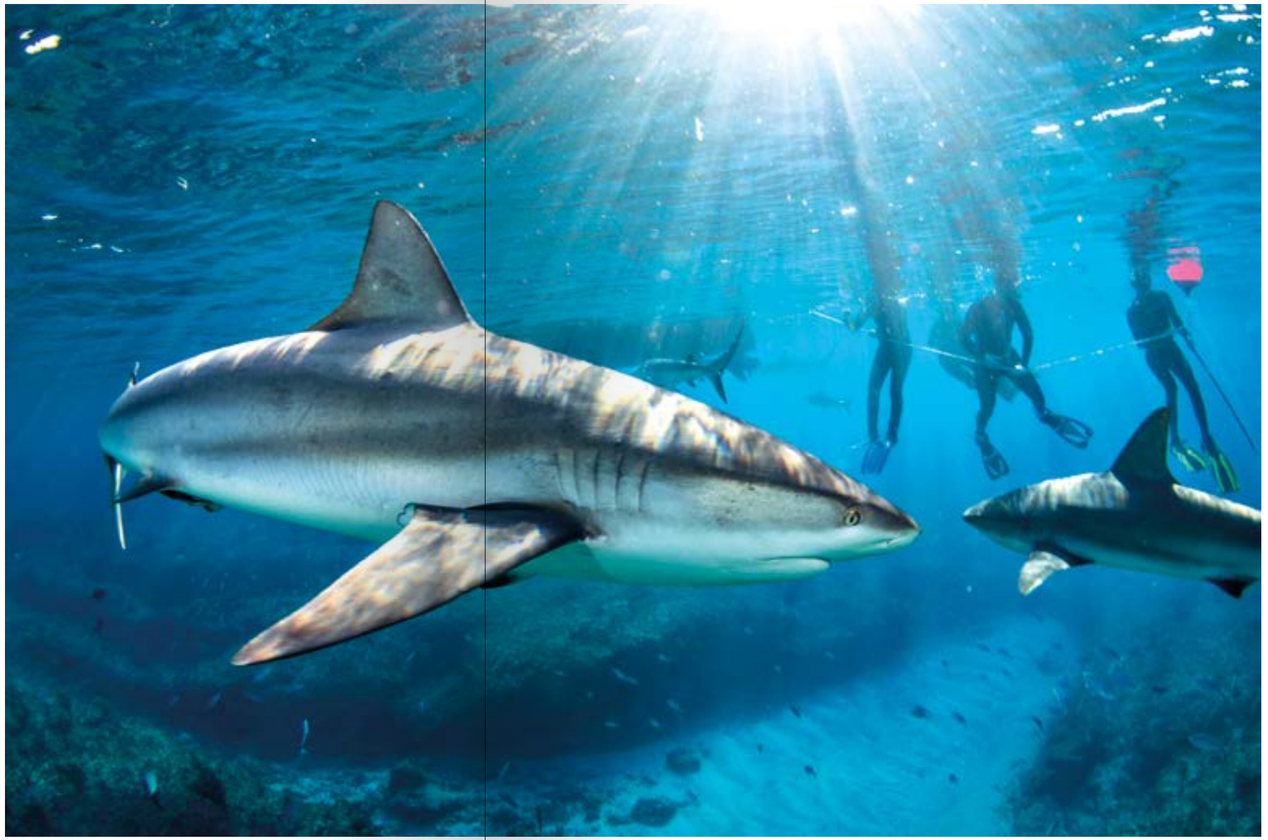
Above, left and right: Nurse sharks cruise the sand flats and rocky reefs of Bimini.

Right: The Caribbean reef shark is one of many shark species observed around Bimini.

SCIENTIFIC OUTPUT

In 2021, the BBFSF contributed to several ongoing manuscripts ranging from animal personality to regional movements of sharks, which resulted in nine peer-reviewed manuscripts accepted for publication and an additional four in review. We continue to collaborate on research projects throughout the region in order to leverage our datasets to provide the most impact for the conservation and management of sharks and rays.

Over the past two years, like many around the world, the BBFSF has faced unprecedented challenges. However, we believe that the future is bright. From everyone at the Bimini Biological Field Station Foundation, I extend our tremendous gratitude for the continued support from the Save Our Seas Foundation and we look forward to a continued partnership for years to come.



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Lowerre-Barbieri S, Friess C ... Smukall M et al. Movescapes and eco-evolutionary movement strategies in marine fish: assessing a connectivity hotspot. *Fish and Fisheries*.

Melillo-Sweeting K, Maust-Mohl M and Smukall MJ. Examining shark bite scars on dolphins off Bimini, The Bahamas: Comparisons between bottlenose and Atlantic spotted dolphins. *Marine Mammal Science*.

Postaire BD, Feldheim KA, Clementi GM, Quinlan J, Van Zinnicq Bergmann MPM, Brooks EJ, Grubbs RD, Guttridge TL, Henderson AC, Tavares R and Chapman DD. Small localized breeding populations in a widely distributed coastal shark community. *Conservation Genetics*.

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More than 5,000 reef manta rays have been recorded so far in the Maldives, making the archipelago home to the world's largest recorded population of the species.

GUY STEVENS

THE MANTA TRUST

DR GUY STEVENS

Although the Covid-19 pandemic is still with us – following a year in which we have seen vaccination rollouts in developed nations going well and our team has continued to drive positive actions for mobulids – we are grateful to be returning to the field in several locations. However, many of our project leaders, their families and colleagues have fallen ill to the virus and sadly several colleagues in Indonesia and South America have died. Therefore, until the world is fully vaccinated, it will not be possible for the Manta Trust and our affiliates' operations to get back to full strength. However, we are proud to report that, despite everything, our global team members are more dedicated to their work, and to supporting each other, than ever before.

OUR CONSERVATION IMPACT

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 2021 the Manta Trust continued to drive progress on our Global Strategy & Action Plan for Mobulid Conservation by building capacity for 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.

The Maldives, where the Manta Trust was born, hosts incredible scenes of natural beauty both above and below the water.

CAPACITY BUILDING & LEGISLATIVE ACTIONS

We remain focused on building capacity for the enforcement of policies and management plans. In the Mexican Caribbean, Karen Fuentes has been running educational workshops and providing Codes of Conduct to more than 70 tour operators and providing training in bycatch mitigation for fishers. In Ecuador, meanwhile, our team has hosted three workshops with tuna fishers and distributed 150 surveys, gathering data for a project to help develop bycatch mitigation technology.

We are a member of the Noo Raajje, a partnership between the government of the Maldives and the Blue Prosperity Coalition to protect the ocean and its resources and to build a bright future for communities, the economy and the environment. The aim is to protect 30% of the Maldives' marine and terrestrial ecosystems by 2030. In line with this goal, in late 2020 data from our Maldives Oceanic Manta Ray Project contributed to the listing of Fuvahmulah and Addu Atoll as UNESCO World Biosphere Reserves.

The Cyclone Grant launched in 2021 gave our members the opportunity to vote for the research project they wished to receive £5,000, which was raised through their Cyclone memberships. This year they chose Dr Annie Murray's fledgling Papua New Guinea Project, which is collaborating with the Sea Women of Melanesia to train and pay indigenous women to collect valuable manta ray data at this understudied location.

Right: PhD candidate Niv Froman conducts a contactless ultrasound scan on a reef manta ray in the Maldives.

Right below: Researchers deploy long-term time-lapse cameras at manta ray cleaning stations to study how the rays use the site.

Opposite: A stereo-video photogrammetry unit is used to get an accurate measurement of the wingspan of an oceanic manta ray.

RESEARCH ACTIVITIES

The Manta Trust's Maldives Oceanic Manta Ray project leader Simon Hilbourne returned to Fuvahmulah in April. The season was slow to start, but thankfully the manta rays did show up for two weeks in May. This gave Simon and his team time for community engagement, and our research and education plans have continued to gain support and traction on the island. Similarly, Joanna Harris was able to spend five weeks in Chagos in April, collecting a wealth of data from acoustic listening stations and oceanographic sensing equipment deployed in the region in 2020 as part of her ongoing PhD. Joanna also deployed another 10 tags and collected dozens more photo IDs.

Thanks to a donation from our sponsor Carl F. Bucherer, the Manta Trust team had an unprecedented opportunity this year to conduct an 18-day expedition with 16 researchers in the Maldives at the beginning of November. Highlights from the trip include surveying 35 manta sites, collecting 92 hours of remote camera imagery from manta sites, carrying out 53 hours of in-water surveys, identifying 28 new manta rays, conducting 20 ultrasound scans, taking 129 stereo-video photogrammetry measurements and 3D-mapping four cleaning stations. We also conducted education and outreach at six schools, reaching 335 students.

Around the world, many of the other projects have continued to get into the field where they can, from Julie Hartup in Guam studying fish-spawning aggregation sites, to Luke Gordon studying the population ecology of manta rays in Fiji, and the Manta Watch New Zealand team deploying satellite tags on oceanic manta rays.

We have designed a new, improved curriculum for the programme we are launching in 2022.

SCIENTIFIC PUBLICATIONS

All the desk work conducted over lockdown has led to a significant increase in the number of Manta Trust scientific publications, with 11 new publications since November 2020 and more in the pipeline. All these publications represent years, even decades, of data collection by our researchers and advance our understanding of these species and the threats they face. For example, the paper published by Daniel Fernando and Dr Josh Stewart on the Sri Lanka fishery highlights that the artisanal fishing fleet in Sri Lanka is drastically overfishing mobulid rays.

We have created a policy to ensure that every peer-reviewed publication led by the charity 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 & EDUCATION

Our educational ambitions continue to grow. In January we welcomed Flossy Barraud into a new core team role of education manager. She developed a comprehensive portfolio of multi-lingual lesson plans to aid teachers around the world in making their students more ocean and climate literate. This launched on our new Education Portal in September. She also ran 'Skype a Scientist' classes with more than 500 students from six UK schools this year.

Our core team has been overseeing the delivery of the Ocean Giants Programme for seven Plymouth University students, providing specialised training on several key aspects of charity management from fundraising to media and communications. We have designed a new, improved curriculum for the programme we are launching in 2022.

On 17 September 2021 we celebrated World Manta Day, using it to launch our Manta Trust Climate Mandate and distribute educational content on the

The Maldives Oceanic Manta Project runs a variety of community outreach and engagement events, including beach clean-ups and school talks.

Above left: Bex Carter, the Manta Trust's director of operations, gives a presentation at the Explorers Against Extinction event at the Royal Geographical Society in London.

Above right: The Manta Trust was selected to attend COP26 in Glasgow, where we shared art, stories and messages from the island nations we work in.

impacts of the climate crisis in the lead-up to COP26 in Glasgow, UK. The Manta Trust attended this conference in November, using our stand to exhibit artwork, poetry and videos from children living in climate vulnerable regions around the world.

CONFERENCE & EVENT ATTENDANCE

In November 2021, as well as attending the Climate COP (see above), half a dozen of the charity's core operations team attended the Beyond and Below event (held by Explorers Against Extinction) at the Royal Geographical Society in London. The Manta Trust's director of operations Bex Carter gave a presentation on the main stage on the Manta Trust's work. We also exhibited and presented at a dive show in Germany and presented via video call at Carl F. Bucherer events in Japan and Geneva.

GLOBAL NETWORK & COLLABORATIONS

The Manta Trust's global network of affiliate projects has continued to grow. We established a new research project in Bora Bora, French Polynesia and welcomed the Caribbean Islands Manta Conservation Program to our network.

We secured funding from the Paul M Angell Foundation and the Enjoolata Foundation.

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

Shark Spotters' automated spotting project had a successful field work season in 2021, resulting in the development of a preliminary shark detection algorithm.

SARAH WARIES

SHARK SPOTTERS

SARAH WARIES

While COVID-19 continued to be a disruptive force in 2021, we took to heart the commitment we made in 2020 to come out of the pandemic stronger and more resilient, and that is certainly what we achieved!

Despite a second hard lockdown at the beginning of the year, our spotting operations continued on 329 days at six beaches during the spring/summer months and four beaches during winter, while the Fish Hoek shark exclusion barrier was deployed on more than 100 occasions in the past 12 months. The spotters recorded 119 bronze whaler shark sightings during the year and a single white shark sighting on 28 March 2021! A further four white shark sightings were confirmed on the inshore of False Bay during 2021 by our research team. While this is by no means a return to normal white shark activity, it is an incredibly promising sign as there had only been one confirmed white shark sighting anywhere in False Bay in the previous two years. This highlights the importance of the long-term monitoring work that Shark Spotters does in False Bay, through the spotters and the research team, in identifying patterns in white shark activity, both from a shark safety perspective and the conservation of this vulnerable apex predator.

This page: We hosted successful beach education events in partnership with the National Sea Rescue Institute to teach beachgoers about shark safety and how to avoid drowning.

Opposite: Shark Club, our school holiday programme, is definitely a highlight for our educators, who provide children with impactful experiential learning opportunities in the coastal environment.

Further afield, our expertise was called on by several areas dealing with shark bites in 2021, including Sharm el-Sheikh in Egypt, and Cintsa and Jeffreys Bay in South Africa. We gladly provided the authorities and coordinating agencies in those areas with advice and knowledge gained from our many years of experience dealing with shark–human conflict. In July 2021, following a non-fatal shark bite in Jeffreys Bay, Shark Spotters played a coordinating role in compiling factual information of the incident for submission to the International Shark Attack File, via the KZN Sharks Board. We also initiated a nationwide coordinating group for shark incident reporting and investigation that has proved very successful to date. These activities demonstrate that Shark Spotters maintain their position as a global leader in sustainable shark bite mitigation and are highly regarded in the shark safety arena.

Our Coastal Conservation Team has grown from strength to strength in the past 12 months and made a significant name for itself in conserving and rehabilitating the coastal zone in Cape Town. From managing major disasters such as a mass nurdle spill and an old municipal dumpsite bursting open at Witsands sand dunes, to the restoration and rehabilitation of sensitive coastal ecosystems, its impact has been wide ranging and well received by authorities and the public. In February 2021 we formed a partnership with the Sustainable Seas Trust to be the coordinating agency for data collection on vessel waste washing ashore in the Cape Town area.

During the school holidays we also hosted 14 'pop-up' education days at the beaches.

Left: Bad decisions made in the past still impact the marine environment today. Sixty years ago, a municipal rubbish dump was created on a shifting sand dune right next to the beach. Despite being out of operation for more than 30 years, it continues to burst open after winter rains, causing decades-old rubbish, mostly plastic, to wash into the ocean.

Right: A stranded dwarf sperm whale is collected and taken for a necropsy at the Department of Forestry, Fisheries and the Environment to provide insight into this rarely seen deep-diving whale.

The team has also initiated a number of other projects to reduce plastic pollution entering the oceans, including the installation of stormwater litter traps at two coastal sites. A litter trap was installed in Muizenberg for six weeks and data collected as part of an undergraduate research project with a student from the University of the Western Cape. In a six-week period more than 4,000 pieces of plastic pollution were trapped and prevented from entering the ocean – an astonishing amount from one small stormwater outfall!

The team has regularly responded to stranded marine animals in the past year (including three leopard seals – an unusual visitor to our coast – turtle hatchlings, countless seabirds and seals) and coordinated the removal of marine animal carcasses (including pygmy and dwarf sperm whales, penguins and a humpback whale, among others). The quick response of the team, in conjunction with other stakeholders such as the City of Cape Town, to deal with these emergencies ensures positive outcomes for both the animals involved and people using the coastal zone for recreation.

We have continued to employ 39 people in the past 12 months, 95% of whom are from previously disadvantaged communities. All the employees are the primary breadwinners in their households, meaning that Shark Spotters directly supports more than 120 individuals. We were grateful to be able to support the team again during the second hard lockdown, both financially and emotionally, at a time when many other organisations were not as lucky.

Right above: The spotters always enjoy a trip to the Save Our Seas Shark Education Centre in Kalk Bay to increase their knowledge of the sharks in False Bay.

Right below: Our information centre in Muizenberg provides an opportunity for all beach-goers to learn about shark safety, irrespective of age!

While the coronavirus pandemic seriously affected our training plans in 2020, we were grateful to get back on track in 2021 and provide a range of valuable skills development opportunities to our team. These included leadership training for management, 15nm skippers' tickets, short-range radio certifications, occupational health and safety (for our management team), herbicide application (for our coastal team), swimming performance and technique training (for our net crew and coastal team), and report writing, financial management and project management (for our management team). We also had an excellent team-building and education day at the Iziko Museum, where the entire team learned about South Africa's natural history through an engaging 'Amazing Race' activity.

A renewed and invigorated education programme took shape in 2021, headed by our new education coordinator Taryn Van Neel, who had joined the team in December 2020. Whereas in previous years our education programme has depended mostly on being invited to schools or events, we took a more proactive approach this year due to the challenges of the coronavirus pandemic, hosting many of our own events and developing a curriculum to market to schools to actively encourage groups to engage with the programme. We ran three successful holiday programmes (in March, October and December 2021) with about 30 attendees each day learning about everything from shark safety to the conservation of our natural resources. During the school holidays we also hosted 14 'pop-up' education days at the beaches where we operate, giving more than 1,000 beach-goers from a wide range of communities the opportunity to engage with the programme and undergo experiential learning through interactive activities during their normal visits to the beach.

We have also expanded our online education this year by developing more dedicated social media campaigns. In March the 'Shark Smart' awareness campaign, in collaboration with the Save Our Seas Foundation Shark Education Centre, focused on raising awareness about the 13 most common shark species in False Bay. In September the 'Shark Safe' campaign, in collaboration with the Shark Attack Campaign, provided water-users with practical steps to reduce their own personal risk of encountering a shark.

A bronze whaler shark is brought alongside our research vessel in preparation for being acoustically tagged as part of an ongoing PhD project investigating the species' spatial ecology.

We were able to resume field work on a number of ongoing research projects this year, including tagging 30 bronze whaler sharks for our PhD project looking at the trophic and spatial ecology of bronze whaler sharks in False Bay. Our MSc 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 also taken a step forward with a preliminary shark detection algorithm being developed and behavioural heuristics of shark movements being incorporated. MSc student Kate Sheridan successfully submitted her thesis in 2021 and published her research examining recreationist perceptions of shark risk and management at two South African beaches in the journal *Marine Policy*. We presented this paper at the South African Shark & Ray Symposium in November 2021.

Our partnership with the City of Cape Town to monitor the effectiveness of the Helderberg Marine Protected Area proved to be an exciting expansion of our research activities. We also initiated a number of other research partnerships: a data collection partnership with the Sustainable Seas Trust to assess marine vessel waste on our coastline; and collaborative research partnerships with ELMO (Elasmobranch Monitoring South Africa) and the WildOceans Shark and Ray Conservation Project, providing them with data to assist in mapping the abundance of sharks and rays in South Africa.

The monitoring of abundance, population dynamics and spatial ecology of white sharks in False Bay remains a top priority and we were able to observe four white sharks from our research vessel during inshore surveys this year. Unfortunately trips to Seal Island to find white sharks were unsuccessful. We are hopeful that we continue to see an increase in white shark activity in the bay in 2022.

A lone male transient orca in Caamano Sound, close to the Fin Island Research Station.

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 has dedicated the past 20 years to research, education and the protection of cetaceans along the north and central coasts of British Columbia. Our objective is to better understand the seasonal distribution, abundance, impacts of vessel strikes, entanglements and social dynamics of cetacean species at risk here. We use marine and land-based survey efforts to identify potential habitats of importance for fin, humpback and killer whale populations. This includes a combination of genetics methodologies and First Nations' traditional ecological knowledge that will help us to better understand and monitor the habitat use of cetaceans in our region. Our outreach programme encourages community stewardship through shared personalised data collection, and we will use the data results to develop mitigation measures to reduce threats to whales, such as entanglement and vessel strikes. 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 for their continued recovery. We recognise the importance of robust scientific research in conjunction with community outreach in having tangible positive impact on the protection of habitat for whale species at risk.

SUMMARY OF DATA COLLECTED

LAND-BASED PLATFORM

During the 2021 field season 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 designated time at both locations to compare results from May until the end of October. Using these sightings, we will map the location and characterise the group size and behaviour of humpback whales, fin whales, killer whales, Dall's porpoise, harbour seals, elephant seals and Steller's sea lions in relation to marine vessel traffic. These results will be available for the end-of-season report due on 31 January 2022.

MARINE VESSEL SURVEYS

NCCS completed 39 marine surveys along designated routes from the north to central coast of British Columbia and nine transect surveys to collect data on orca and individual humpback and fin whales. These data included photographs for the purpose of identification and observations of behaviour, group dynamics, prey when possible and specific habitat use. During these surveys, photographs were collected from a Canon 6D SLR camera and a Mavic Pro drone for the purpose of identification and scar detection from either a vessel strike or entanglement from fishing gear. The use of both a drone and an SLR camera has improved our method of identifying whales by fluke and dorsal, to also include the chevron pattern that is unique to individual fin whales. We identified 119 humpback whales seen in previous years and 46 fin whales, as well as 16 resident and six transient orca matrilines during the 2021 season. A total of 17 humpback whales (this number is still pending) were identified as new arrivals to the area. During the 2020 and 2021 seasons we continued to document an increase in mother–calf humpback pairs, many of which were seasonal residents to the area. This is an extremely encouraging observation and we are investigating the cause of this recent fluctuation. The number of resident humpback whales observed bubble-net feeding has also increased significantly, while the group size of some of these events has decreased and there has been a dramatic change in the bubble-net feeding call. These changes in this feeding technique will be the topic of our next two project papers.

Below left: Armour is installed to protect a hydrophone cable at a new site. The hydrophone will record the acoustic activity of vocal orca, fin and humpback whales.

Below middle: Rest is well earned at the end of a long day of doing maintenance at the research station.

Below right: The hydrophone for installation at a new location has been transported there by boat.

Above: Along our marine survey route we have set up a new hydrophone station near the First Nations community of Klemtu.

Divers will secure the hydrophone's mooring in a stable location so that it can record the calls of whales in the vicinity of OrcaLab.

Opposite: As the sun sets, a last scan for whales is made from the deck of the Fin Island Research Station.

DRONE SURVEYS

During drone focal follows, NCCS targeted humpback whales engaged in bubble-net feeding, fin whales in a resting pattern and transient orca foraging and food sharing. We conducted 103 drone flights, which included nine focal follows of groups of humpback whale bubble-net feeding events and seven focal follows of fin whales. We learned a great deal from this season of drone operation. We observed that whales were visible at the surface for long periods of time where previously they had not been detected from the perspective of a marine vessel operator. Follow-up analysis of focal follow video tracks may be able to determine the proportion of time they are visible versus not visible at the surface. This type of travel just below the surface could potentially put whales at risk of vessel strikes. Additionally, the fact that bubble-net feeding is an acoustically active behaviour could allow for a direct comparison of feeding events between visually observed feeds (with the drone from the boat) and with acoustic localisations. A more detailed investigation of bubble-net feeding events, and a comparison of visual and acoustic validation, will be beneficial in the 2022 season.

COAST-WIDE HYDROPHONE NETWORK

NCCS has taken the lead role in planning, facilitating and executing the British Columbia Coast-Wide Hydrophone Network with the mandate to increase and strengthen valuable partnerships. This allows for the merging of diverse layers of experience in the specialised field of acoustic monitoring. Our objective has been to build and maintain a unique and well-thought-out coast-wide hydrophone network, with an emphasis on protecting habitat for cetacean species at risk. Additionally, this project generates data for research, management and stewardship purposes to better understand the impact of anthropogenic noise on cetaceans and the habitat they depend on to ensure their long-term recovery and survival. To date we have installed 18 hydrophone stations in remote and key locations, including within the traditional territories of coastal First Nations. As a result of this success, other First Nation communities have expressed interest in joining the project to share traditional knowledge and facilitate community engagement. The acoustic database will assist the comparison of vessel traffic impact on cetaceans at risk in areas that differ environmentally and acoustically and will enable scientists to quantify how the ocean soundscape is changing.

NCCS continues to maintain an array of four hydrophones that transmit whale vocalisations back to the Fin Island station where all calls are recorded live, 24 hours a day. In partnership with the Gitga'at First Nation and WWF we developed a localisation strategy and algorithms that determine the time differences of arrivals between all four hydrophones. The outcome enabled us to localise the vocal signatures of whales and follow their acoustic underwater pathways. This unique localisation method will eventually be used in areas of high concern along the coast of British Columbia, led by NCCS. Three species were vocally recorded during our 2021 field season: orca, humpback and fin whales.

With dedicated teamwork and collaboration, and the support of the Save Our Seas Foundation, the 2021 season has been successful in strengthening our knowledge base to ensure the continued recovery of whales. Thank you.

Three species were vocally recorded during our 2021 field season.

Opposite: A whale's eye view of the Fin Island station.

Left: Two companion humpback whales dive in unison.

Above: A hydrophone is set up on board before being deployed by First Nation Gitga'at Guardian Divers.

PUBLISHED PAPERS 2020/21

Social survival: Humpback whales *(Megaptera novaeangliae)* use social structure to partition ecological niches within proposed critical habitat. June 2021. *PLoS ONE* 16(6):e0245409. DOI:10.1371/journal.pone.0245409

Acoustic tracking of fin whales: Habitat use and movement patterns within a Canadian Pacific fjord system. June 2021. *The Journal of the Acoustical Society of America* 149(6):4264-4280. DOI:10.1121/10.0005044

Fin whales of the Great Bear Rainforest: *Balaenoptera physalus velifera* in a Canadian Pacific fjord system. September 2021. *PLoS ONE* 16(9):e0256815. DOI:10.1371/journal.pone.0256815

catRlog: a photo-identification project management system based in R. August 2021. *Mammalian Biology – Zeitschrift für Säugetierkunde*. DOI:10.1007/s42991-021-00158-7

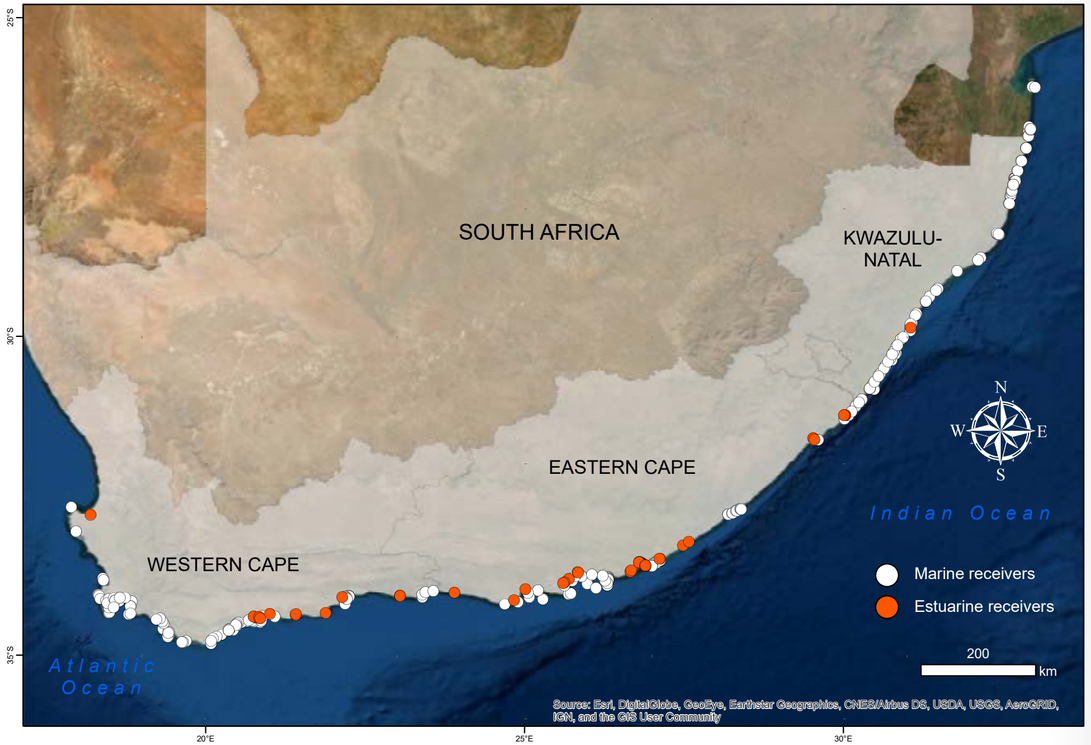
Prof. Nikki James of the South African Institute for Aquatic Biodiversity assesses the shallow water environment of Flat Rocks in Gqeberha.

PAUL COWLEY

THE ACOUSTIC TRACKING ARRAY PLATFORM

DR PAUL COWLEY

South Africa's Acoustic Tracking Array Platform (ATAP), hosted by the South African Institute for Aquatic Biodiversity, provides a backbone of acoustic telemetry hardware to facilitate the large-scale, long-term monitoring of acoustically tagged marine animals. Tagged animals are monitored by a network of more than 250 moored acoustic receivers spanning approximately 2,200 kilometres (1,370 miles) of the South African coastline, from the Berg Estuary in the Western Cape to Ponta do Ouro at the South Africa/Mozambique border, and 21 estuaries throughout the region.



Above: Field work for the first 180 kHz acoustic telemetry study in South Africa concluded in December 2021.

Right: In the course of this work, juvenile blacktail and Cape stumpnose fish were tagged with V5 innovasea transmitters.

The effectiveness of the protection and management of the marine realm and its natural resources in southern Africa is lagging behind most other parts of the world. Therefore, understanding the movement behaviour of important fishery species and top and intermediate predators is vitally important for developing effective management measures. Collectively, this information can contribute to conserving and using marine resources sustainably (SDG 14: *Life below water*), improving food security (SDG 2: *Zero hunger*), working towards sustainable consumption patterns (SDG 12: *Responsible consumption and production*) and alleviating poverty (SDG 1: *No poverty*). The ATAP is well positioned in the international arena and continues to have strong ties with the Canadian-based Ocean Tracking Network (OTN) (SDG 17: *Partnerships for the goals*). By working with and providing support to scientists from more than 24 organisations, the ATAP also aims to develop human capacity, with emphasis on training students from historically disadvantaged institutions and involving female researchers (SDG 4: *Quality education*; SDG 5: *Gender equality*), and currently provides data for 14 postgraduate projects.

Understanding the movement behaviour of important fishery species and top and intermediate predators is vitally important for developing effective management measures.

Above: A juvenile smooth hammerhead shark is safely released in Mossel Bay after being surgically fitted with an acoustic transmitter.

Opposite: In addition to its stunning coloration, this sub-adult dusky kob displays a very conspicuous dart tag.

While the ongoing global Covid-19 pandemic has hampered some aspects of field work, 2021 was another good year for the ATAP. We and our deployment collaborators were able to maintain normal functioning of the network. More than 186 receivers were successfully retrieved and downloaded, together amassing almost 1.6 million detections. An additional 96 animals from 14 species were tagged, including 21 bronze whaler sharks *Carcharhinus brachyurus* (Vulnerable), 13 whitespotted wedgefish *Rhynchobatus djiddensis* (Critically Endangered) and 12 grey reef sharks *C. amblyrhynchos* (Endangered). Together, this brings the total number of animals tagged and monitored to 1,591 from 48 species (including nine ray and 22 shark species). Of those, 43 species are still being monitored, of which 63% fall into IUCN Red List Threatened categories (15 Vulnerable, six Endangered and six Critically Endangered).

Movement information is critical for the development of appropriate management strategies, especially for marine spatial interventions such as marine protected areas. By placing receivers strategically within biologically significant or protected areas, it is possible to gain a better understanding of the relative importance of these areas to both resident and migratory species. It is essential to understand the degree of efficacy and connectivity between these marine protected areas, as without protection fish would be overexploited, stocks would collapse and resources would be consumed unsustainably, which would lead to hunger and a major loss of biodiversity – all of which would have a severe impact on society. The collaborative ATAP network footprint extends into several southern African marine protected areas, including those at De Hoop Nature Reserve, the Greater Addo Elephant National Park, Pondoland and St Lucia. In 2022 work will be conducted in the Goukamma Nature Reserve and Amathole marine protected areas, focusing on endemic resident sea bream species.

The Save Our Seas Foundation very kindly provided funding for a transmitter grant, which was applied for via an open call. Four applications were received on projects ranging from tagging Critically Endangered soupfin sharks *Galeorhinus galeus* along the southern coast of South Africa to assessing habitat use of reef mantas *Mobula alfredi*, an important ecotourism species, in South Africa. The 2021 grant was awarded to Dr Edward Butler of Rhodes University and the Southern African Fisheries and Ecology Research (SAFER) Lab, whose work aims to lead to a better understanding of the movement patterns of the Critically Endangered eagle ray *Myliobatis aquila* along the southern and eastern coasts of southern Africa.

As the world slowly opened up in 2021, the ATAP team was able to attend an in-person conference in Gansbaai, Western Cape, from 17 to 19 November 2021 – the 6th Southern African Shark & Ray Symposium, whose theme was 'Post-pandemic research on southern African chondrichthyans'. The ATAP team also held a stakeholder meeting at the conference, which was well supported by 40 participants. The ATAP continues to be recognised as a mature cooperative telemetry network and to be mentioned in international literature, including 10 papers published in 2021. Unfortunately no papers using data collected by the ATAP were published in 2021. However, a number of long-term projects are coming, and have come, to an end and we are hopeful that the number of publications acknowledging the ATAP and funders will increase over the next two to five years.

At least 27 Critically Endangered duckbill rays have been acoustically tagged along the South African coastline, enabling researchers to learn more about their coastal movements.

The permanently open Kowie River estuary provides the perfect in situ laboratory in which to study the movements of several estuary-associated species.

The ATAP continues to engage with the public in many ways, but for almost two years it has been communicating primarily via social media platforms. The number of followers on our social media pages (Facebook, Twitter and Instagram) continues to grow steadily, reaching 1,859 on Facebook (ATAP – Tracking fish movements), 1,201 on Twitter (@ATAP_ZA) and 553 on Instagram (@atap_za). The ATAP also took part in a number of awareness weeks, including Shark Awareness Week and National Marine Week, producing video content for both initiatives. Our instrument scientist, Dr Taryn Murray, gave a seminar reflecting on the first decade of aquatic animal tracking in South Africa, which has received 62 views on SAIAB's YouTube channel (https://www.youtube.com/watch?v=jhVaFcQHwj0).

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

PROJECT LEADERS

INTRODUCTION TO OUR PROJECT LEADERS WHO WERE FUNDED IN 2021

SMALL GRANT PROJECTS

1. **KIRSTI ANN BURNETT** | CAPE VERDE
2. **DIANA CATARINO** | PORTUGAL
3. **FABIO CUELLO MERCADO** | COLOMBIA
4. **ASHLEY MACKENZIE DAWDY** | USA
5. **EBEENA FRANCIS** | INDIA AND THE ANDAMAN AND NICOBAR ISLANDS
6. **GLORIMAR FRANQUI-RIVERA** | PUERTO RICO
7. **MICHAEL GRANT** | PAPUA NEW GUINEA
8. **ELIZABETH GUTIERREZ LLANOS** | PERU
9. **BLAKE HAMILTON** | USA
10. **AMANDA JHU XHIN LEUNG** | MALAYSIA
11. **ILSE ALEJANDRA MARTÍNEZ** | MEXICO
12. **HEIDI McILVENNY** | IRELAND
13. **JENNIFER PYTKA** | THAILAND
14. **GOBIRAJ RAMAJEYAM** | SRI LANKA
15. **FERNANDA ROCHA** | BRAZIL
16. **EDUARDO SEGURA** | PERU
17. **JOAQUÍN SOTO** | PATAGONIA
18. **MICHAEL WANG** | USA
19. **JULIA WESTER** | USA
20. **CAROLYN WHEELER** | AUSTRALIA
21. **FENELLA WOOD** | ISLES OF SCILLY, UK
22. **LIONEL YAMB** | CAMEROON

KEYSTONE PROJECTS | CONTINUATION

23. **CANDICE BRITTAIN** | THE BAHAMAS
24. **EDUARDO ESPINOZA** | GALÁPAGOS
25. **JONATHAN GREEN** | GALÁPAGOS
26. **CHRYSOULA GUBILI** | THE MEDITERRANEAN
27. **JEANNE MORTIMER** | D'ARROS ISLAND AND ST JOSEPH ATOLL, SEYCHELLES
28. **JUAN TORRES** | GALÁPAGOS
29. **TERENCE VEL** | SEYCHELLES
30. **ALINA WIECZOREK** | REPUBLIC OF MALDIVES
31. **TONYA WILEY** | USA
32. **JANE WILLIAMSON** | AUSTRALIA

KEYSTONE PROJECTS | NEW

33. **RANDALL ARAUZ** | COSTA RICA
34. **HOLLIE BOOTH** | INDONESIA
35. **DEMIAN CHAPMAN** | HONG KONG
36. **ANDREW CHIN** | BORNEO
37. **PHIL DOHERTY** | REPUBLIC OF CONGO
38. **NIGEL DOWNING** | SEYCHELLES
39. **DANIEL FERNANDO** | SRI LANKA
40. **ALEJANDRO GONZALEZ** | MEXICO
41. **SOFIA GRACA ARANHA** | PORTUGAL
42. **JASMIN GRAHAM** | WORLDWIDE
43. **DEAN GRUBBS** | THE BAHAMAS
44. **ALIFA HAQUE** | BANGLADESH
45. **TOM HART** | ANTARCTICA
46. **ALI HOOD** | NORTH AFRICA AND THE EASTERN MEDITERRANEAN
47. **CATHERINE JONES** | SCOTLAND
48. **KELLY KINGON** | TRINIDAD
49. **JEREMY KISZKA** | SEYCHELLES
50. **PETER KYNE** | INDONESIA
51. **EEN IRAWAN PUTRA** | INDONESIA
52. **NUNO QUEIROZ** | ST HELENA
53. **NADIA RUBIO** | MEXICO
54. **SALLY SNOW** | PHILIPPINES
55. **ARISTIDE TAKOUKAM KAMLA** | CAMEROON
56. **JEFF WHITTY** | WORLDWIDE

KIRSTI ANN BURNETT

IT'S IN THE GENES: CONSERVING CABO VERDE'S BLACKCHIN GUITARFISH POPULATIONS

Leibniz Centre for Tropical Marine Research
Sharks of the Atlantic Research and Conservation Centre
University of Bremen

CAPE VERDE | CONSERVATION, RESEARCH | BLACKCHIN GUITARFISH *GLAUCOSTEGUS CEMICULUS*

Although most of Kirsti's work is lab-based in Germany, she's building a reference genome (all the genetic material for the species) for Cabo Verde's blackchin guitarfish. Critically Endangered blackchin guitarfish are regularly sighted around the uninhabited island of Santa Luzia, which is one of 10 islands peppered around Cabo Verde, an archipelago 600 kilometres (370 miles) off Senegal in West Africa. Kirsti, researchers and local fishers catch these guitarfish and take small tissue samples before releasing them. This population will provide a new resource to be used for future research and conservation efforts of blackchin guitarfish – and other species of giant guitarfish.

DIANA CATARINO

SUSTAINABLE SCIENCE IN THE DEEP BLUE SEA

Okeanos

PORTUGAL | CONSERVATION, RESEARCH | DEEP-SEA ELASMOBRANCHS

Diana is diving deep into the waters of the Azores to find non-harmful ways to document the diversity and abundance of deep-water sharks. Combining environmental DNA (eDNA) samples – taken from depths of as much as 1,500 metres (4,920 feet) – with deep-sea baited remote underwater video system (BRUVS) records, she will contrast her findings using these two non-invasive methods with those of the existing demersal longline fishing surveys. Through this project, she hopes to identify the most sustainable ways to monitor the more than 30 deep-sea sharks caught as bycatch by bottom longline and handline fishing around the Azores.

FABIO CUELLO MERCADO

MANAGING MANGROVES AND MPAS FOR COLOMBIA'S LARGETOOTH SAWFISH

COLOMBIA | CONSERVATION. LARGETOOTH SAWFISH *PRISTIS PRISTIS*

Fabio is working for mangroves and towards an MPA by restoring native species, collecting plastic waste and demarcating important coastal areas – all this in a bid to bring to life a comprehensive strategy to save largetooth sawfish off the coast of Colombia. Fabio will also be training indigenous personnel and publicising the project at education centres. He hopes this will bring new attention to the important biodiversity, including sawfish, of the Sierra Nevada de Santa Marta and the coast of the Arahuac indigenous territory, in the Caribbean Sea off Colombia.

ASHLEY MACKENZIE DAWDY

DOES HABITAT USE CHANGE WITH AGE FOR COWNOSE RAYS?

Florida State University

USA | CONSERVATION, RESEARCH | COWNOSE RAY *RHINOPTERA BONASUS*

Ashley is catching cownose rays to tag them with an acoustic transmitter and using the network of listening stations established in her research area to passively track where the rays move through their different life stages. Ashley works in Apalachicola Bay, a large and highly productive estuary in the north-east Gulf of Mexico that is also a biodiversity hotspot and a federally designated National Estuarine Research Reserve. Her study on the movement patterns of these rays, which are highly migratory and vulnerable to overfishing, comes at an important time after unregulated fishing led to the population's collapse.

EBEENA FRANCIS

AMENDING THE UNDERSTANDING OF DEEP-SEA GULPER SHARKS OF INDIA

Society for Marine Research & Conservation, India

INDIA AND THE ANDAMAN AND NICOBAR ISLANDS | RESEARCH | GULPER SHARKS *CENTROPHORUS* SPP.

Ebeena is uncovering new information about the abundance and diversity of gulper sharks. Her focus is on three landing sites where deep-sea fish are brought ashore and where she collects tissue samples and documents bycatch from these fisheries. The project aims to clarify taxonomic confusion about gulper sharks and will centre on Cochin in Kerala on India's south-west coast, Thothoor in Tamil Nadu on India's south-east coast and the Andaman and Nicobar islands.

MICHAEL GRANT

RE-WRITING THE SAWFISH STORY: INSPIRING COMMUNITY-DRIVEN CONSERVATION OF SAWFISHES IN PAPUA NEW GUINEA

James Cook University

PAPUA NEW GUINEA | CONSERVATION, RESEARCH | SAWFISH

Michael is dedicated to the conservation of Papua New Guinea's sawfishes and to providing materials for children so that they understand their incredible natural inheritance. His field work entails observing fishing activity at each village as the team travels through remote Papua New Guinea. He wants to harness local knowledge through interviews about sawfishes and their cultural uses, fishing and how communities value sharks and rays. The idea is to put together a picture of Papua New Guinea's small-scale fisheries and document the distribution and population status of some of the world's most threatened sharks and rays.

ELIZABETH GUTIERREZ LLANOS

ASSESSMENT OF CATCH AND BYCATCH OF GUITARFISHES IN PERUVIAN WATERS

Areas Costeras y Recursos Marinos (ACOREMA)

PERU | CONSERVATION, RESEARCH | GUITARFISH *PSEUDOBATOS* SPP.

Mercedes is visiting the ports and fish landing sites of 12 ports in Peru. She records and collects samples as the fishers unload their catches, searching for guitarfishes. Mercedes is keen to work with the natural curiosity of the fishers who want to know more about her work and to use these interactions to get more information and involve fishers in this research. In this way, her project can provide an understanding of how and where guitarfishes are being caught along the Peruvian coast.

GLORIMAR FRANQUI-RIVERA

THE DEEP-WATER SHARKS OF PUERTO RICO

University of Puerto Rico Mayaguez Campus

PUERTO RICO | CONSERVATION, EDUCATION | SHARKS

Glorimar is gathering baseline information on which sharks and rays are being caught and consumed in Puerto Rico's fisheries, as there is little information on where sharks and rays are found in this region, what their diversity is and how they are fished. Her project is employing molecular tools to help contribute to this much-needed knowledge, while communicating her findings to the wider Puerto Rican community through education and creating awareness about shark conservation.

BLAKE HAMILTON

TEMPERATURE-DRIVEN MOVEMENT PATTERNS OF BLACKNOSE SHARKS IN FLORIDA BAY AND THE FLORIDA KEYS

Florida State Coastal and Marine Laboratory

USA | CONSERVATION, RESEARCH |
BLACKNOSE SHARK *CARCHARHINUS ACRONOTUS*

Blake's project, which is a collaboration with NOAA Southeast Fisheries Science Center's Gulf of Mexico Shark Pupping and Nursery Area Survey, aims to identify important habitats for baby coastal sharks. His focus is on blacknose sharks in the Florida Keys and Florida Bay, which is an area of overlap in the distribution of the Gulf and Atlantic populations. These two populations are currently managed separately by federal agencies and Blake wants to find out how they use these areas. He hopes that fishery managers will use the information he collects to make harvests sustainable and that these habitats will be protected.

AMANDA JHU XHIN LEUNG

ALL ABOUT THE BOTTLENOSE: AN ENDANGERED WEDGEFISH IN MALAYSIA

Universiti Malaya

MALAYSIA | CONSERVATION, RESEARCH |
WHITE-SPOTTED WEDGEFISH *RHYNCHOBATUS AUSTRALIAE*

Amanda is doing DNA analyses to clarify the genetic structure of bottlenose wedgefish (also called white-spotted wedgefish) and her project aims to determine the local population structure and fishery threats of this species in Malaysia. She visits crowded landing sites to collect genetic samples and talk with local fishers to understand their perspective on catching bottlenose wedgefish. She uses fish landing site surveys and face-to-face interviews to understand which fishing gear is used and to assess catch profile information. Amanda hopes her work will inform conservation actions and provide gear-specific management to protect this Endangered species.

ILSE ALEJANDRA MARTÍNEZ

MEXICO'S FORGOTTEN SHARKS: REDISCOVERING A NATURAL LEGACY

Mar Sustentable Ciencia y Conservacion

MEXICO | CONSERVATION, RESEARCH | RAYS & SKATES, SHARKS

Ilse is working with fishers of the largest coastal lagoon in south-east Mexico. Terminos Lagoon is located in the state of Campeche, in the Yucatán Peninsula, and has a fishing history dating back to the Mayans. While Terminos is important to Mexico's coastal economy and culture, it's also an important site for sharks and rays. So Ilse will be interviewing coastal fishers to glean insights into the sharks from their fishing tales and lifetime of stories.

HEIDI McILVENNY

RAISING AWARENESS OF THE CRITICALLY ENDANGERED FLAPPER SKATE IN NORTHERN IRELAND

Ulster Wildlife

IRELAND | EDUCATION | FLAPPER SKATE *DIPTURUS INTERMEDIUS*

Heidi trains volunteer sea-anglers to tag sharks, skates and rays around Northern Ireland. She also communicates the data collected by these anglers with government departments to inform more conservation measures for endangered Irish sharks. The flapper skate is a protected species that is especially vulnerable to damage during catch-and-release angling. Special training is vital if these skates are to be returned safely to the sea with a chance of survival. Heidi is using a 3D, life-sized, weighted model of a flapper skate to host training sessions with anglers so that they learn how to handle and release this Critically Endangered skate.

JENNIFER PYTKA

UNDERSTANDING THE AMULET TRADE OF BOWMOUTH GUITARFISH IN THAILAND

Bangor University, School of Ocean Sciences

THAILAND | CONSERVATION, RESEARCH | BOWMOUTH GUITARFISH *RHINA ANCYLOSTOMA*

Jennifer's research will start in the world's busiest amulet market of Tha Prachan in Bangkok. From there, she'll be tracing trade and supply chain routes through other markets and ports to glean information from local traders and fishers. Her focus is on collecting data on bowmouth products, such as how much is present in the markets and what drives the trade. She hopes these data will help to guide critical research, fill in knowledge gaps and contribute to informing trade policy, both nationally and internationally.

GOBIRAJ RAMAJEYAM

IDENTIFYING NURSERY HABITATS AND DETERMINING THE LIFE HISTORY OF GUITARFISH IN SRI LANKA

Blue Resources Trust

SRI LANKA | CONSERVATION, RESEARCH
SHARPNOSE GUITARFISH *GLAUCOSTEGUS GRANULATUS*

Gobiraj is the lead researcher for the Blue Resources Trust's Sri Lanka Elasmobranch Project for the north and east coasts. To understand the composition of Sri Lanka's shark and ray fisheries, with a particular focus on the Critically Endangered sharpnose guitarfish, he collects identification photos and a host of measurements, as well as gathering tissue samples for genetic and stable isotope analysis. Gobiraj also speaks to local fishers to understand fishing gear and catch locations. He aims to use his project's insights to help shape policy and better protect sharks and rays – and the sharpnose guitarfish – across the region.

FERNANDA ROCHA

UNRAVELLING THE AMPHI-AMERICAN GUITARFISHES: GENETICS, MORPHOLOGY AND BIOGEOGRAPHY OF GUITARFISHES

Pontifícia Universidade Católica do Rio Grande do Sul

BRAZIL | RESEARCH | GUITARFISH *PSEUDOBATOS* SPP.

Fernanda is using genetic samples of guitarfishes to disentangle the life histories and genetics of the nine different species found around the Americas and the Caribbean. Identification to species level simply by eye in the field is difficult and requires much experience. However, guitarfishes are often caught as bycatch or the targets of trawlers – and not all species are under equal pressure. Fernanda's project will go a long way towards helping to inform the management of these species within their range.

EDUARDO SEGURA

WHICH NURSERY IS BEST FOR PERU'S SMOOTH HAMMERHEAD SHARKS?

Universidad Austral de Chile

PERU | CONSERVATION, RESEARCH | SMOOTH HAMMERHEAD SHARK *SPHYRNA ZYGAENA*

Eduardo's project will be running stable isotope analyses to understand what hammerhead shark pups are eating and how they are using different habitats. He is focusing on three nursery areas that were identified in southern Peru, testing whether there are differences between the hammerhead populations in each nursery, and which hammerhead pups are in the best condition. This information will be used to inform conservation and management plans for each nursery area or hammerhead pup population.

JOAQUÍN SOTO

OF SHARKS, SALMON AND SEA-FARMS

Universidad Austral de Chile

PATAGONIA | RESEARCH | SHARKS

Joaquín's love of time at sea and enthusiasm for working with fishers comes in handy for his project. He collaborates with local fishers to collect shark stomach and muscle samples in southern Chile's marine waters. By processing these samples, he hopes to understand what impact salmon aquaculture is having on where the sharks are moving, and what they're eating, in Patagonia's fjords.

MICHAEL WANG

DON'T BE CAUGHT SLEEPING: PROACTIVE CONSERVATION RESEARCH FOR PACIFIC SLEEPER SHARKS

Pfleger Institute of Environmental Research

USA | CONSERVATION, RESEARCH | PACIFIC SLEEPER SHARK *SOMNIOSUS PACIFICUS*

Mike's idea for satellite tagging Pacific sleeper sharks came about while working on a larger project to find better ways to harvest local swordfish around San Diego, California. When sleeper sharks started appearing regularly as bycatch on the swordfish fishery gear, Mike decided to tag them to understand how they use their deep ocean home – and how we can avoid or reduce future entanglements. By collecting information on light levels, depth, water temperature and animal movement patterns, this project can bring to the surface much-needed life history information to aid the conservation of Pacific sleeper sharks.

JULIA WESTER

CHANGING HEARTS AND MINDS ABOUT SOUTH FLORIDA'S SHARKS

Field School

USA | CONSERVATION, EDUCATION, RESEARCH | ELASMOBRANCHS

Julia wants to help sharks and rays in Biscayne Bay, a marine estuary on South Florida's coast. She wants to understand what people already know and value about the bay, and learn how to best approach them to drive change. As the co-founder of Field School, a marine science programme in South Florida and the Caribbean, and the director of the Field School Foundation, a non-profit engaging people in science, talking to people about conservation is something Julia knows well. She's using qualitative and quantitative methods to get the most nuanced picture of the human side of conservation challenges.

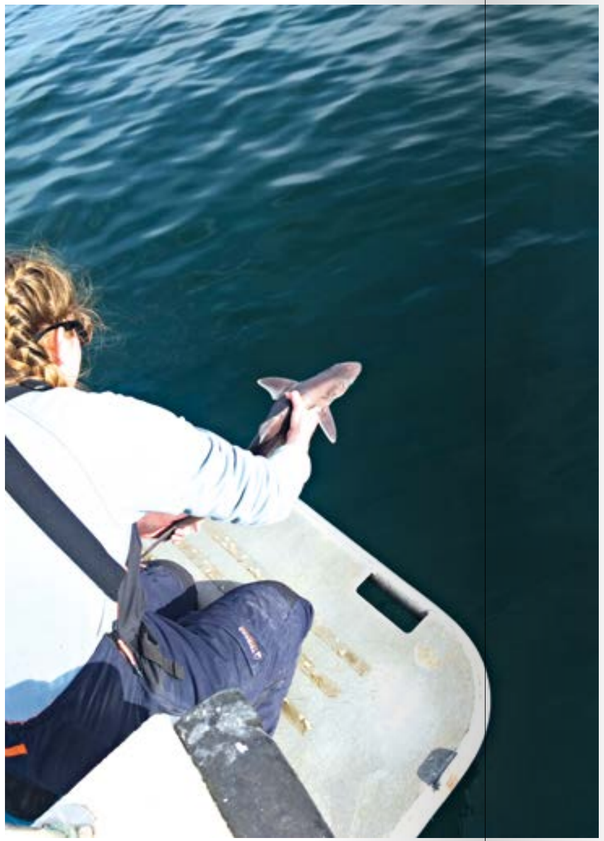
CAROLYN WHEELER

THE HEAT IS ON: HOW MIGHT RISING TEMPERATURES AFFECT SHARK REPRODUCTION?

James Cook University

AUSTRALIA | CONSERVATION, RESEARCH
EPAULETTE SHARK *HEMISCYLLIUM OCELLATUM*

Carolyn is interested in the potential impact of rising ocean temperatures on the ability of epaulette sharks to reproduce successfully. Her work to date has already investigated how higher temperatures might affect the development of the embryos and hatchlings of these small, egg-laying sharks that are found along Australia's Great Barrier Reef. Based on Heron Island, her project now focuses on how thermal stress affects adults and their ability to breed. Using portable ultrasound technology, her research will bring new insights into egg-case development and hormone concentrations in our changing oceans.



FENELLA WOOD

BRITISH SHARK LIFE: ARE SPURDOG SIBLINGS STICKING TOGETHER?

University of Aberdeen

ISLES OF SCILLY, UK | CONSERVATION, RESEARCH | SPURDOG *SQUALUS ACANTHIAS*

Fenella is studying Scotland's spurdogs, a small shark found across the British Isles and in temperate regions around the world. While commercial targeting of spurdogs has been banned after major population declines, whole aggregations can be caught as bycatch. Fenella's team is asking how related a population might be if it is caught in a single aggregation event off the Isles of Scilly. Her project can not only look at the relatedness of spurdogs around the British Isles, but also provide insight into the diet and movement of spurdogs within aggregations.

LIONEL YAMB

CONSERVATION FOR CAMEROON'S SHARKS AND RAYS

Agricultural Research Institute for Development of Cameroon
Department of Fisheries and Aquatic Resources Management

CAMEROON | CONSERVATION, RESEARCH | GREAT HAMMERHEAD SHARK *SPHYRNA MOKARRAN*, DAISY STINGRAY *DASYATIS MARGARITA*

Lionel is gaining insight into Cameroon's sharks and their conservation status. His focus lies on the country's north coast, a stretch that runs for more than 160 kilometres (100 miles) at the foot of Mount Cameroon, central Africa's highest mountain and an active volcano. The region Lionel is researching hosts critical habitats for sharks and rays and is a proposed marine protected area. He is scouring landing sites and fish markets and gleaning traditional ecological knowledge through interview surveys and questionnaires. His goal is to provide decision-makers with a baseline of shark and ray occurrence data to ensure the species' long-term conservation.

CANDICE BRITTAIN

BUILDING FUTURE CONSERVATION LEADERS IN THE BAHAMAS

Cape Eleuthera Institute

THE BAHAMAS | EDUCATION

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.

EDUARDO ESPINOZA

CONSERVATION STRATEGIES FOR HAMMERHEAD SHARK NURSERIES IN THE GALÁPAGOS MARINE RESERVE

Galápagos National Park Service

GALÁPAGOS | RESEARCH, CONSERVATION | SCALLOPED HAMMERHEAD SHARK *SPHYRNA LEWINI*

The scalloped hammerhead shark is 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.

JONATHAN GREEN

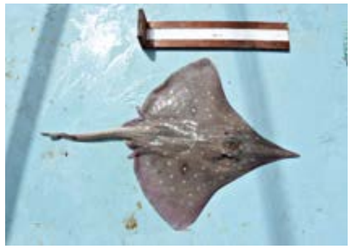
SECRETS OF THE WHALE SHARKS OF THE GALÁPAGOS MARINE RESERVE

Galápagos Whale Shark Project

GALÁPAGOS | RESEARCH, CONSERVATION | WHALE SHARK *RHINCODON TYPUS*

Jonathan is tracking whale shark movement patterns using different satellite tags to understand where the sharks 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.

CHRYSOULA GUBILI



BATOIDS ON YOUR PLATE: SPECIES COMPOSITION OF THE MEDITERRANEAN RAY TRADE

Fisheries Research Institute, Hellenic Agricultural Organisation | DEMETER

THE MEDITERRANEAN | CONSERVATION | SKATES AND RAYS

Protecting rays and skates (batoids) is challenging, especially where there are inadequate fisheries regulations. Chrysoula is identifying which batoids are caught in the Mediterranean to understand the effects of fishing practices and what illegal, unreported and unregulated fishing means for vulnerable species.

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 | RESEARCH, CONSERVATION, EDUCATION | 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.

JUAN TORRES

CONNECTING COMMUNITIES TO CONSERVATION

Charles Darwin Foundation

GALÁPAGOS | RESEARCH, CONSERVATION, EDUCATION | SHARKS

Juan is on a mission: to get local people into the ocean around the Galápagos Islands and thereby spark a connection that will see them want to protect their environment. As the leader of the Charles Darwin Foundation's Education Program, Juan runs experiential marine education activities that tie into the islands' formal and informal education systems. His project funding will help expand his development programmes for learners, helping them to foster a real curiosity about and passion for the ocean.

TERENCE VEL

ENVIRONMENTAL EDUCATION IN SEYCHELLES

University of Seychelles

SEYCHELLES | EDUCATION, 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 grant recipient from the Foundation. 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 showing children how to 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.

ALINA WIECZOREK

MICROPLASTICS A MACRO-DISASTER: A THREAT TO THE LARGEST FISH OF OUR SEAS

National University Ireland Galway

REPUBLIC OF MALDIVES | RESEARCH | WHALE SHARK *RHINCODON TYPUS*

Endangered filter-feeding whale sharks are at risk from the plastic invisible to most of us in the seas. Alina and her colleague Giulia are investigating how these sharks are scooping up microplastics as they feed. They are also trying to find out where these plastics might be coming from.

TONYA WILEY

INVESTIGATING THE USE OF TAMPA BAY BY THE ENDANGERED SMALLTOOTH SAWFISH

The Ocean Foundation on behalf of Havenworth Coastal Conservation

USA | RESEARCH | SMALLTOOTH SAWFISH *PRISTIS PECTINATA*

The smalltooth sawfish populations that once spread from Texas to North Carolina have vanished, except for a small reserve in South Florida. However, it seems that protection measures in recent years might be helping these sawfishes to recover. Tonya is searching for clues in Tampa Bay, the first place where recovering sawfish populations would extend their range north.

JANE WILLIAMSON & PATRICK BURKE

DIVERSITY, DYNAMICS AND DESTINATIONS OF SAWSHARKS FROM SOUTH-EASTERN AUSTRALIA

Macquarie University

AUSTRALIA | RESEARCH | COMMON SAWSHARK AND SOUTHERN SAWSHARK *PRISTIOPHORUS* SPP.

Managing sawshark populations requires good information about where they move and what their relative abundance is. Jane and Paddy are using various methods to improve our understanding of the conservation status and management of common and southern sawsharks threatened by fishing in south-eastern Australia.

RANDALL ARAUZ

MARINE PROTECTED AREAS TO CONSERVE HIGHLY MIGRATORY SHARKS IN THE EASTERN TROPICAL PACIFIC

University of Costa Rica

COSTA RICA | CONSERVATION, EDUCATION | SHARKS

Randall wants to help better protect migratory marine animals in the Eastern Tropical Pacific. He is interested in hammerhead sharks that aggregate around ocean islands (which are protected) and then migrate along the Las Gemelas and West Cocos sea mounts (which are unprotected) between these islands. After deploying acoustic receivers, i.e. deep listening stations, at the summits of these underwater mounts, Randall and his team will track tagged hammerhead sharks in relation to these sea mounts. The team will also deploy baited remote underwater video systems (BRUVS) to do ongoing monitoring at both sites.

HOLLIE BOOTH

SOLUTIONS FOR SHARK FISHERIES IN A SURFERS' PARADISE

University of Oxford

INDONESIA | CONSERVATION, RESEARCH | 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 Palau Weh, and the fishing communities of Tanjung Luar and Aceh Jaya, Hollie is searching for ways to reduce the threats facing sharks in fisheries.

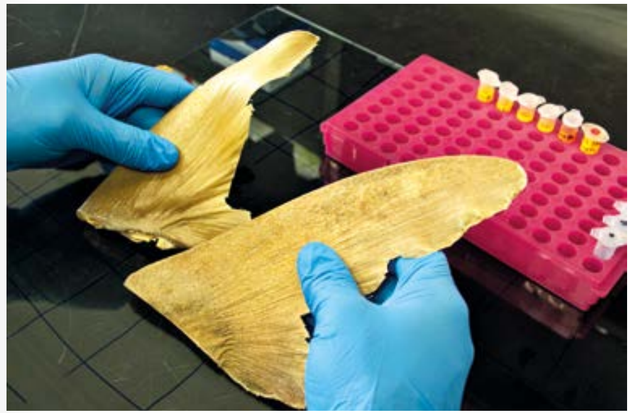
DEMIAN CHAPMAN

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

Mote Marine Laboratory

HONG KONG | CONSERVATION, RESEARCH | RAYS & SKATES

Demian's team is developing tools that help border control officers identify illegal shark products. His project sifts 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 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 used 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 | CONSERVATION, RESEARCH | 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 is 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 | CONSERVATION, RESEARCH | 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 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 on 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 | RESEARCH | 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 hiatus, he is covering survey sites between four key islands and reef systems: Aldabra, Assumption, Astove and St Pierre. While some divers use videos to record the condition of the corals and sea floor, others survey fish species, which are recorded in a database for analysis.

DANIEL FERNANDO

WHAT'S THE CATCH? UNDERSTANDING SHARK CATCHES IN LARGE-SCALE, DATA-LIMITED ARTISANAL FISHERIES

Blue Resources Trust

SRI LANKA | CONSERVATION, EDUCATION, RESEARCH | SHARKS

Daniel and the team from the Blue Resources Trust want to understand which sharks, rays and skates are caught in Sri Lanka's artisanal fisheries. They are focused on landing sites around Valaichchenai in Sri Lanka's Eastern Province, where many small boats still land on the beaches rather than at a central harbour, making precise data collection difficult. The team hopes to identify sharks in fishers' catches and use their data to apply cutting-edge modelling techniques. Their aim is to extend what they learn here to the rest of Sri Lanka, and perhaps the world!

ALEJANDRO GONZALEZ

PROTECTING NORTH AMERICA'S LARGEST NO-TAKE MARINE PROTECTED AREA

Parque Nacional Revillagigedo

MEXICO | CONSERVATION | RAYS & SKATES, SHARKS

As the director of Mexico's largest marine protected area, Alejandro has a vested interest in ensuring that Revillagigedo Archipelago National Park has the capacity to intercept illegal vessels in its waters. Skylight satellite technology currently allows the team to identify illegal vessels within the park's boundaries, but rangers are limited in their ability to respond and apprehend these vessels because their own vessel is small and unseaworthy over long distances. Alejandro's project aims at enhancing the capacity for marine enforcement by adding an interceptor vessel to the park for rangers.

SOFIA GRACA 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 | CONSERVATION, RESEARCH | RAYS & SKATES, SHARKS

Sofia is driven by a passion for deep-sea sharks and aims to produce a fishing 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-east 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 | CONSERVATION, EDUCATION | 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. It offers video lessons, activities and quizzes. It also hosts live virtual seminars to bridge the gap between scientists and the public and grow a new generation of conservation-minded shark advocates.

DEAN GRUBBS

ALL ABOUT SAWFISH IN THE BAHAMAS: TRACKING MOVEMENT, BREEDING AND NURSERIES

Florida State University

THE BAHAMAS | CONSERVATION, RESEARCH | RAYS & SKATES

Dean's research is focused on the biology and ecology of the smalltooth sawfish and he concentrates his efforts around the island of Andros in The Bahamas. As the largest island in The Bahamas, Andros is the least densely populated and its remote west side is nearly pristine. Dean collects blood from smalltooth sawfish to assess reproductive status, muscle samples for food web analyses and fin clips for genetic studies. He tags each sawfish, which is then tracked by satellites and acoustic receivers, to learn more about where these animals move, what they do and how best they can be conserved.

ALIFA HAQUE

PROTECTING RHINO RAYS IN THE WORLD'S LARGEST BAY

Department of Zoology, University of Dhaka

BANGLADESH | CONSERVATION | RAYS & SKATES

Alifa's longstanding project in south-eastern Bangladesh involves 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 | CONSERVATION, RESEARCH | SEABIRDS

Tom has a once-in-a-lifetime opportunity to tease apart the impacts of human visitation, climate change and fishing on Adélie, gentoo and chin-strap 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' worth 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 | CONSERVATION, RESEARCH | 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 | CONSERVATION, RESEARCH | 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 sub-set of the most informative genetic markers for each species, which will help inform conservation strategies and protected area management for both species in Scottish seas.

KELLY KINGON

COMMUNITY-SUPPORTED CONSERVATION GOALS FOR SCALLOPED HAMMERHEAD

University of Trinidad and Tobago

TRINIDAD | CONSERVATION, EDUCATION, RESEARCH | 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. They will track movement patterns, site fidelity, growth rates, home ranges and mortality rates of the species.

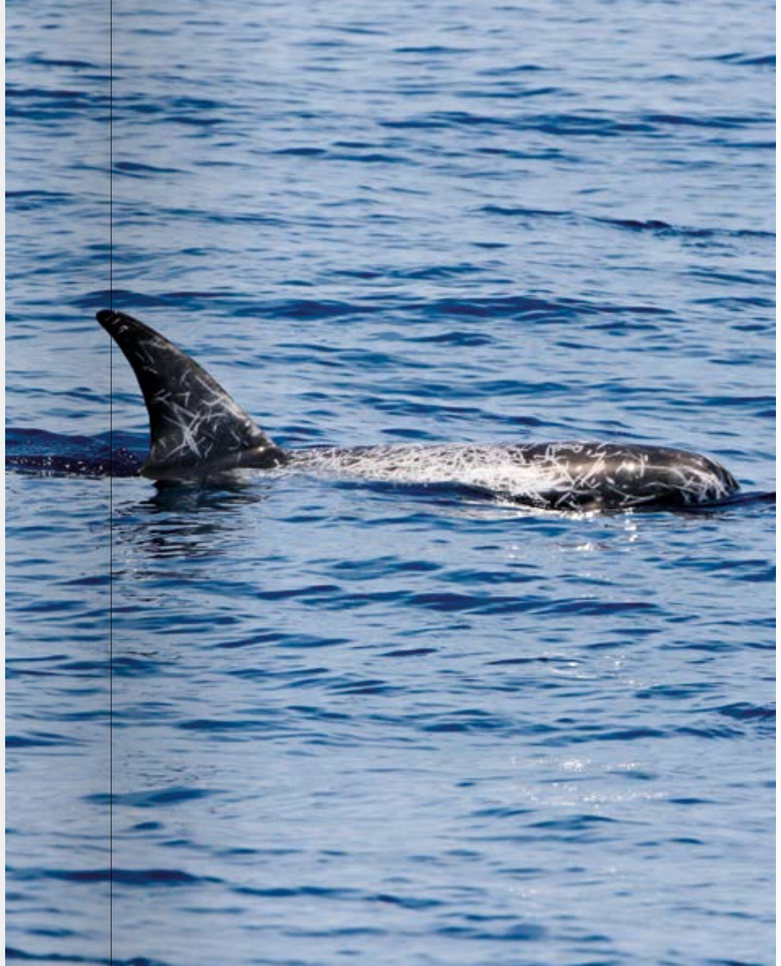
JEREMY KISZKA

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

Florida International University, SOSF-DRC

SEYCHELLES | RESEARCH | 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 and 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 | CONSERVATION, EDUCATION, RESEARCH | SHARKS

Peter credits the recent location of the rare and relatively unknown clownfish wedgefish to searching social media posts of 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.

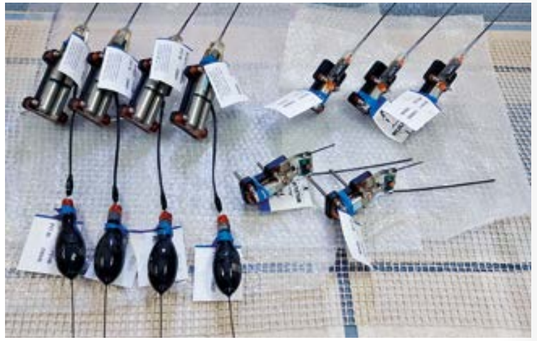
EEN IRAWAN PUTRA

RHINO RAY CONSERVATION IN INDONESIA

Rekam Jejak Alam Nusantara Foundation

INDONESIA | CONSERVATION | 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 | CONSERVATION, EDUCATION, RESEARCH | 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 is focused 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, 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 | CONSERVATION, EDUCATION | SHARKS

Nadia learns about life in the sea from those who spend their lives around the sea. Collecting local ecological knowledge about sharks, sawfishes, manatees and sea turtles, she connects this information with spatial data to understand Mexico's marine biodiversity. Nadia is focused on Holbox Island off the Yucatan Peninsula in Quintana Roo. The island comprises a coastal lagoon surrounded by mangroves (thought to be a shark breeding ground) and its sea floor is 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.

SALLY SNOW

SHARKS OF THE SULU SEA

Large Marine Vertebrates Research Institute Philippines (LAMAVE)

PHILIPPINES | EDUCATION | SHARKS

Sally is working with local researchers and communities in the Palawan province to produce a film that will advance protection of the Philippines' natural heritage. Her focus is on sharks and rays in the Sulu-Sulawesi Marine Ecoregion. The Sulu Sea, where the film is set, is both a site of incredible marine diversity and one of the region's key fishing grounds. Sally will bring to communities stories of one of the world's largest shark aggregations at Tubbataha Reefs Natural Park, the whale sharks and feeding aggregations of oceanic manta rays at Honda Bay, visions of Cagayancillio (the country's largest marine protected area) and a newly-discovered reef manta ray cleaning station.

ARISTIDE TAKOUKAM KAMLA

COMBINING COMMUNITY AND GENETICS FOR CONSERVATION IN CAMEROON

African Marine Mammal Conservation Organization

CAMEROON | CONSERVATION, RESEARCH | RAYS & SKATES, SHARKS

Aristide created a citizen science platform and mobile app for fishers along 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 scours the beaches to check for strandings and sea turtle nests. During these visits he collects tissue samples of threatened species that can give more insights into the diversity, population size and structure of vulnerable sharks.

JEFF WHITTY

PROVIDING SAWFISH EDUCATION FOR GLOBAL CONSERVATION ACTION

Sawfish Conservation Society

WORLDWIDE | EDUCATION | RAYS & SKATES

Jeff is on a mission to create high-quality and accurate educational materials in at least six languages that will create awareness about all five sawfish species. As one of the most threatened groups of sharks and rays in the world, sawfishes need conservation attention – and Jeff believes the success of this action will rely on public buy-in and support. Translating impactful information into English, Spanish, French, Portuguese, Indonesian, Arabic and Bengali, he hopes to create an online platform that is accessible to government, conservation, research and educational institutions, as well as the general public, in sawfish hotspots around the world.

COMMUNICATION PROJECTS

OVERVIEW OF THE COMMUNICATION PROJECTS WE SUPPORTED IN 2021

EXPOSUB | NEUCHÂTEL, SWITZERLAND

SANTA CRUZ SEA WALL EVENT | SANTA CRUZ, USA

TWO OCEANS AQUARIUM SHARK ALLEY | CAPE TOWN, SOUTH AFRICA

MUSEUM OF DISCOVERY AND SCIENCE | FORT LAUDERDALE, USA

To balance limitations necessitated by the Covid-19 pandemic with the world's craving for connection, a new approach was needed when it came to raising awareness about sharks and rays in 2021.

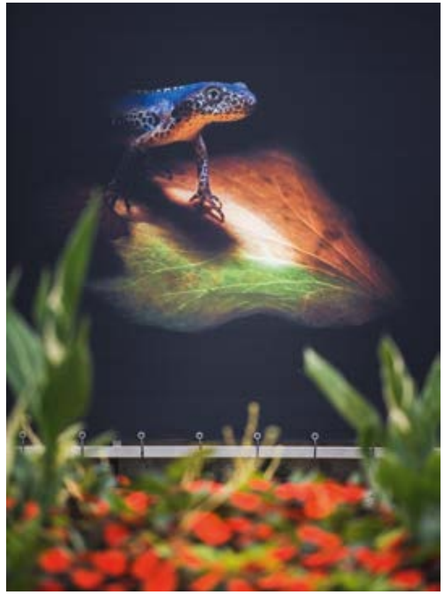
save our seas foundation

SOSF COMMUNICATION PROJECTS

Sponsorships are an important part of the Save Our Seas Foundation's mission to reach a wide audience about the plight of sharks and rays in the oceans. By partnering with an array of organisations and funding a diversity of endeavours, the foundation can vary its messaging and reach its audience in innovative ways, from art and photography to a speaker series and collaborative conferences. The Save Our Seas Foundation is proud to have supported interesting new ways of sharing marine life with the world in 2021.

A BREATH OF FRESH AIR: *EXPOSUB 2021*

The foundation was delighted to fund a novel and free solution to the restrictions imposed by Covid-19 on indoor events and, in particular, the underwater film festival Festisub. Between June and August in 2021, a casual stroll along the Ostervald Quay on the shore of Lake Neuchâtel in Romany, Switzerland, became a deep dive into the wonder of the ocean. Fifteen striking underwater images were displayed along the lakeshore walkways and a quick QR code scan connected



Captivating images are a breath of fresh air on a lakeside stroll in Switzerland. Engaging outdoors with the issues in the nature world may inspire new thoughts about conservation.

viewers with top scientists, authors and media personalities sharing their take on the images and their poignancy in today's conservation climate. Fostering a love for the ocean among land-locked citizens in Switzerland forms part of connecting everyone, no matter how physically distanced from the sea, with their own sense of our reliance and impact on marine wildlife and with our shared responsibility for keeping oceans healthy in the future.

Bright colours make a splash in Santa Cruz, bringing local sharks ashore to celebrate our place alongside them in nature.

SEA WALLS: *ARTISTS FOR OCEANS*

The Save Our Seas Foundation was the 2021 conservation partner for the PangeaSeed Foundation's global Sea Walls programme, which took place in Santa Cruz, California, from 13 to 18 September. Fifteen thought-provoking murals advocating for healthy oceans were on display and a week-long series of events promoted public engagement with the Sea Walls public art. In addition to sponsoring the event, the foundation funded a wall by artist David Rice. By blending graphic overlays with an organic style that prompts the viewer to think about co-existence, David's work pleads for a world where human beings can live in harmony with nature. His mural placed a shark in settings familiar to Santa Cruz locals, for instance alongside a California poppy. Its aim complemented the mission of the Save Our Seas Foundation: to make the event's attendees aware of the plight of sharks, prompting them to place themselves within a larger ecosystem and think about our dependence on healthy oceans and healthy shark populations.

Dr Clova Mabin (right), director of the SOSF Shark Education Centre, introduces visitors to the newly launched Shark Alley (left).

SHARK ALLEY LAUNCHES AT THE TWO OCEANS AQUARIUM

Wrapped around the outer walls of the Save Our Seas Foundation's Shark Exhibit at the Two Oceans Aquarium in Cape Town, South Africa, is the newly launched Shark Alley. The alley is named for the narrow ocean channel that hosts high numbers of white sharks at Gansbaai, about 170 kilometres (105 miles) south-east of Cape Town, and invites aquarium visitors to learn more about shark biology and conservation. As they enter Shark Alley they are introduced to different shark species and their realistic sizes, then learn more about the role of sharks and rays in the ocean. The launch took place on 26 October 2021 for 60 invited guests and opened this interactive educational display that will benefit the South African public and the aquarium's many international visitors. Dr Clova Mabin, the director of the SOSF Shark Education Centre, pointed out the synergy between the work she and her team do at the education centre and the information on display at Shark Alley. The message of human beings' dependence on sharks and healthy oceans and our responsibility to ensure that they persist is one shared by the Save Our Seas Foundation and the Two Oceans Aquarium.

Above: A beloved cultural institution for STEM education, the Museum of Discovery and Science has been centrally located in downtown Fort Lauderdale, Florida, for more than 40 years.

Left: Museum guests snap a photo in front of the life-size megalodon, an apex predator in Florida approximately 17.2 million years ago. Each year MODS welcomes 450,000 guests from all walks of life, inviting them to connect with inspirational science and ultimately take action for the health of our oceans and planet.

MUSEUM OF DISCOVERY AND SCIENCE: SAVE OUR SEAS DISTINGUISHED SPEAKERS SERIES

The Save Our Seas Foundation partnered once more with the Museum of Discovery and Science in Fort Lauderdale, Florida, this time to host an exciting line-up of speakers in 2021. In the Distinguished Speaker Series, the foundation brought together experts in science, conservation and education from its pool of project leaders for a free event aimed at highlighting conservation efforts and successes and our role in maintaining a healthy planet. From Janie Wray's tales of the whales of British Columbia to Guy Stevens's manta ray research and Kadie Lyons's look at marine pollution and its impact on sharks, viewers could watch via Zoom or attend live at the museum. A sea turtle and shark expert panel discussion formed part of the popular event and brought together views and insights from across the region. A Shark Bio cart and information banners, as well as a slide show in the Imax theatre, brought the physical presence of the Save Our Seas Foundation to the museum's visitors.

Left above: A MODS Life Sciences animal keeper presents an Eco Talk.

Left below: The Museum of Discovery and Science is the Eco Hub for Resiliency Education, building community solutions that will impact climate change.

FUTURE OCEANS: THE *BOTTLE AT SEA* ART INSTALLATION

The Save Our Seas Foundation's support for Maori artist George Nuku's art installation at the Geneva Natural History Museum continued throughout 2021, bringing the *Bottle at Sea 2120, Te Ao Maori* and its message to museum visitors for a further year. The Plastic Pollution in Our Oceans conference on 24 October was a topical highlight, offered to the public and featuring one of the foundation's project leaders, Alina Wieczorek. Bringing key information about plastic pollution, its impact on our oceans and the threat it poses to sharks is vital if we are to change some habits that we find hard to shake.

YOUNG MARINE BIOLOGIST SUMMIT: OCEAN PREDATORS

The Save Our Seas Foundation partnered with the Marine Biological Association in the United Kingdom to present 'Ocean Predators!', the theme of the 5th Annual Young Marine Biologist Summit. Over the weekend of 27–28 November 2021, aspiring young marine biologists could join for free online and listen to talks by inspiring marine conservation professionals and role models. With career advice, prizes and cutting-edge information available, the summit formed part of the joint goal of the Marine Biological Association and the Save Our Seas Foundation to foster a new generation of well-educated as well as passionate marine biologists.

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 | USA
4. **SOSF D'ARROS RESEARCH CENTRE** | D'ARROS | SEYCHELLES
5. **SOSF ISLAND SCHOOL** | MAHÉ | SEYCHELLES

SOSF HEADQUARTERS
GENEVA I SWITZERLAND

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.

AURÉLIE GROSPIRON
DIRECTOR OF COMMUNICATION

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.

KALK BAY I WESTERN CAPE I SOUTH AFRICA

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.

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.

SOSF HEADQUARTERS
SOUTH AFRICA

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.

USA

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.

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 studies 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.

CRAIG HALEY
EDUCATOR

Craig grew up in Cape Town's southern Peninsula, where he had a view of the ocean. As a child, he would often visit the beach, enjoying watersports among the waves and daydreaming of the mystical creatures that lay hidden beneath the water's surface. It was his childhood fascination with the ocean that enticed him to study marine biology, starting with a Bachelor's degree in biological sciences from the University of KwaZulu-Natal. In 2015, he returned to university to further his education and completed a Master's degree in applied marine science at the University of Cape Town.

In between his academic pursuits, Craig indulged a second passion: field hockey. He represented South Africa for six years and played in some of the best domestic leagues around the world. For the past few years he has been coaching hockey in several local schools.

Craig loves adventure and enjoys exploring the natural environment on land and in the sea. He has an advanced diver's certificate and scuba-dives around South Africa's coastline whenever he gets the opportunity. On land, he enjoys hiking, camping, trail running and game viewing. There are so many interesting marine and terrestrial animals around Cape Town, he says, 'it really gives me joy to share with younger generations my knowledge of our wild neighbours'.

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.

ZANELE MAYIYA
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.

SOSF SHARK RESEARCH CENTER
DANIA BEACH | USA

MAHMOOD SHIVJI
DIRECTOR

Mahmood is professor of marine science at Nova Southeastern 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.

SOSF D'ARROS RESEARCH CENTRE
SEYCHELLES

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.

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 ASSISTANT

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.

SOSF ISLAND SCHOOL
MAHÉ I SEYCHELLES

DILLYS POUPONEAU
RESEARCH ASSISTANT

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.

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.

SEYCHELLES AMBASSADOR
MAHÉ I 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.

FUNDING SUMMARY

SUMMARY OF ALL PROJECTS FUNDED BY THE SAVE OUR SEAS FOUNDATION IN 2021

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

SOSF SPONSORSHIPS

Conference | Latin American Conference of Sharks, Rays and Chimaeras

Conference | Southern African Shark and Ray Symposium 2021

Conference | European Elasmobranch Association (EEA) Scientific Conference

Conference | Sharks International 2022

Education | Young Marine Biologist Summit 2021

Education | Dugong educational book

Education | Book *Save Our Sharks* | Good Heidi Production

Event | Pangea Seed Foundation | Sea Walls Santa Cruz 2021 | Street Art

Event | Museum of Discovery & Science (MODS) | SOSF Distinguished Speaker Series

Event | Wavescape Festival, Cape Town 2022

Event | Festisub | Exposub, Neuchâtel 2021

Event | Marine Conservation Photographer of the Year 2022

Sponsorship | Africa's Great Sea Forest | Peschak

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

Sponsorship | Rima Jabado | A roadmap for future policy and research actions for sharks, rays and chimaeras | 2022

Sponsorship | Two Oceans Aquarium, Cape Town

Sponsorship | Lost Sharks | NatGeo

Sponsorship | SOSF film | Pippa Ehrlich and Tasmin Vosloo

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ALL SOSF PROJECTS FUNDED IN 2021
In alphabetical order of project leaders

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SMALL GRANT PROJECTS

BURNETT | It's in the genes: conserving Cabo Verde's blackchin guitarfish populations

CATARINO | Sustainable science in the deep blue sea

CUELLO MERCADO | Managing mangroves and MPAs for Colombia's largetooth sawfish

DAWDY | Does habitat use change with age for cownose ray?

FRANCIS | Amending the understanding of deep-sea gulper sharks of India

FRANQUI-RIVERA | The deep-water sharks of Puerto Rico

GRANT | Re-writing the sawfish story: inspiring community-driven conservation of sawfishes in Papua New Guinea

GUTIERREZ LLANOS | Assessment of catch and bycatch of guitarfishes in Peruvian waters

HAMILTON | Temperature-driven movement patterns of blacknose sharks in Florida Bay and the Florida Keys

LEUNG | All about the bottlenose: an Endangered wedgefish in Malaysia

MARTÍNEZ | Mexico's forgotten sharks: rediscovering a natural legacy

McILVENNY | Raising awareness of the Critically Endangered flapper skate in Northern Ireland

PYTKA | Understanding the amulet trade of bowmouth guitarfish in Thailand

RAMAJEYAM | Identifying nursery habitats and determining the life history of guitarfish in Sri Lanka

ROCHA | Unravelling the amphi-American guitarfishes: genetics, morphology and biogeography of guitarfishes

SEGURA | Which nursery is best for Peru's smooth hammerhead sharks?

SOTO | Of sharks, salmon and sea-farms

WANG | Don't be caught sleeping: proactive conservation research for Pacific sleeper sharks

WESTER | Changing hearts and minds about South Florida's sharks

WHEELER | The heat is on: how might rising temperatures affect shark reproduction?

WOOD | British shark life: are spurdog siblings sticking together?

YAMB | Conservation for Cameroon's sharks and rays

KEYSTONE PROJECTS | CONTINUATION

BRITTAIN | Building future conservation leaders in The Bahamas

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

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

GUBILI | Batoids on your plate: species composition of the Mediterranean ray trade

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

TORRES | Connecting communities to conservation

VEL | Environmental education in Seychelles

WIECZOREK | Microplastics a macro-disaster: a threat to the largest fish of our seas

WILEY | Investigating the use of Tampa Bay by the Endangered smalltooth sawfish

WILLIAMSON | Diversity, dynamics and destinations of sawsharks from south-eastern Australia

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ARAUZ | Marine protected areas to conserve highly migratory sharks in the Eastern Tropical Pacific

BOOTH | Solutions for shark fisheries in a surfers' paradise

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

FERNANDO | What's the catch? Understanding shark catches in large-scale, data-limited artisanal fisheries

GONZALEZ | Protecting North America's largest no-take marine protected area

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

GRAHAM | Gill Guardians: an elasmobranch conservation and education hub

GRUBBS | All about sawfish in The Bahamas: tracking movement, breeding and nurseries

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

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

SNOW | Sharks of the Sulu Sea: media campaign to support elasmobranch conservation in Palawan, Philippines

TAKOUKAM KAMLA | Combining community and genetics for conservation in Cameroon

WHITTY | Providing sawfish education for global conservation action

Due to the ongoing impacts of the pandemic, the Scientific Advisory Team had to meet virtually to select projects for grants.

CREDITS

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Registered address:
Rue François Bellot 6, 1206 Geneva, Switzerland
Mailing and office address:
Rue Philippe-Plantamour 20, 1201 Geneva, Switzerland
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Editorial team: Lauren De Vos, Sandrine Griffiths,
Aurélie Grospiron, James Lea
Book design: Thom design studio

Copy editing & proofreading: Mary Duncan, Leni Martin

Portraits: Sam Kerr

Photography: Roberto Ochoa: Cover and back cover. Christopher Vaughan-Jones: p.2, 41. Dillys Pouponeau/SOSF AR: p.4, 20 (top), 24 (top). Matthew During: p.6, 8 (left), 10. Kristian Laine: p.8 (right). Brenda Walters: p.8. Tom Hart: p.11 (top), 116. William Gammuto: p.11 (bottom). D.Roeger: p.14-15. Henriette Grimmel p.16, 17, 20 (below), 21, 24, 25, 26. Robert Bullock: p.18. SOSF-SEC: p.28, 31, 33-37. Danel Wentzel: p.30. Nic Good: p.32. James Lea: p.38, 42, 43 (right), 47. Pelayo Salinas: p.43 (left), 46 (left). Sophie Hart: p.44, 96. Morne Hardenberg: p.45. Guy Stevens: p.48, 58, 61, 62. Chelle Blais: p.50–55, 57. Baylie Fadool: p.55, 56. Simon Hilbourne: p.60, 63, 64 (top), 65 (left). Kaitlyn Zerr: p.64 (bottom). Paul Jackson: p.65 (right). Shark Spotters: p.66–73. Janie Wray: p.74, 77, 79, 80, 81. Blake Hamilton: p.90. Tavish Campbell: p.78. Taryn Murray: p.82, 85, 89. Adam Trotter: p.86. Vivienne Dames: p.87, 88. Kirsti Ann Burnett: p.92. Diana Catarino: p.93. Fabio Cuello Mercado: p.93. Ebeena Francis: p.94. Michael Grant: p.94. Elizabeth Gutierrez Llanos: p.94. Omar Lopez: p.95. Amanda Jhu Xhin Leung: p.96. Laura Matheson: p.97. Ilse Alejandra Martínez: p.97. Heidi McIlvenny: p.98. Jennifer Pytka: p.98. Gobiraj Ramajeyam: p.99. Fernanda Rocha: p.99. Eduardo Segura: p.100. Joaquín Soto: p.101. Miller: p.101 (middle). Julia Wester: p.101. Carolyn Wheeler: p.102. Fenella Wood: p.102. Lionel Yamb: p.103. Candice Brittain: p.104. Eduardo Espinoza: p.104. Jonathan Green: p.105. Chrysoula Gubili: p.106. Jeanne Mortimer p.106. Juan Torres: p.106. Terence Vel: p.107. Dawid Szlaga: p.108. Matthew Bernanke: p.108 (right). Patrick Burke: p.109. Edwar Herreno: p.110 (left). Hollie Booth: p.110. Demian Chapman: p.111. Andrew Chin: p.111. Phil Doherty: p.112. Nigel Downing: p.112. Jordan Moss: p.113 (left). Eric Higuera: p.113 (right). Sofia Graça Aranha: p.114. Jasmin Graham: p.114. Dean Grubbs: p.115. Alifa Haque: p.115. Shutterstock: 116 (right). Catherine Jones: p.117. Terryn Constantine: p.118. Jeremy Kiszka: p.118. Peter Kyne: p.119. Een Irawan Putra: p.120. Nuno Queiroz: p.120. Nadia Rubio: p.121. Titus Canete: p.122. Aristide Takoukam Kamla: p.122. Jesirae Collins: p.123. Fabrice Chapuis: p.124, 128, 129. Tré Packard | PangeaSeed Foundation: p.126, 130. Devon Bowen, Two Oceans Aquarium: p.131 (left). Rebekah Plath, Two Oceans Aquarium: p.131 (right). Museum of Discovery and Science: p.132–133. Dino Sabic: p.134

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