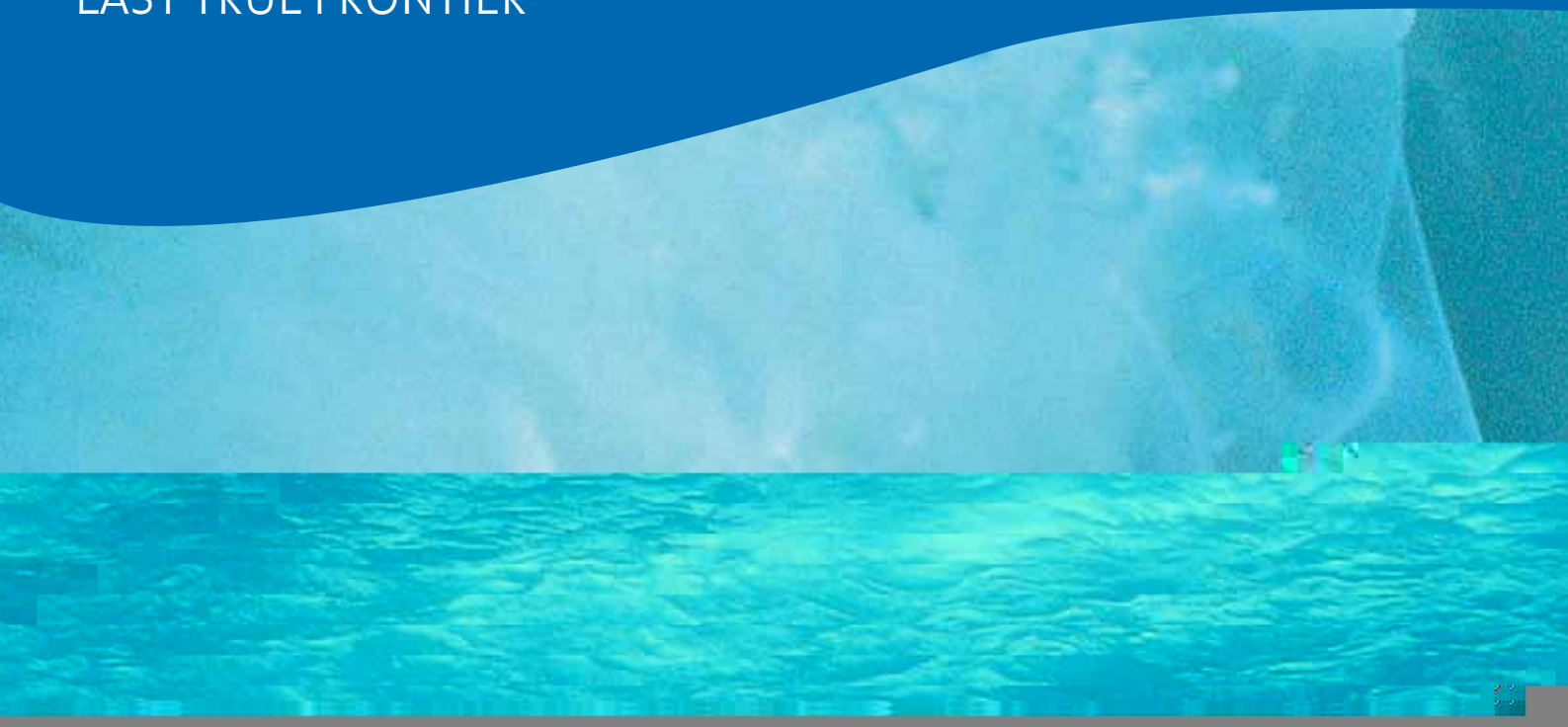
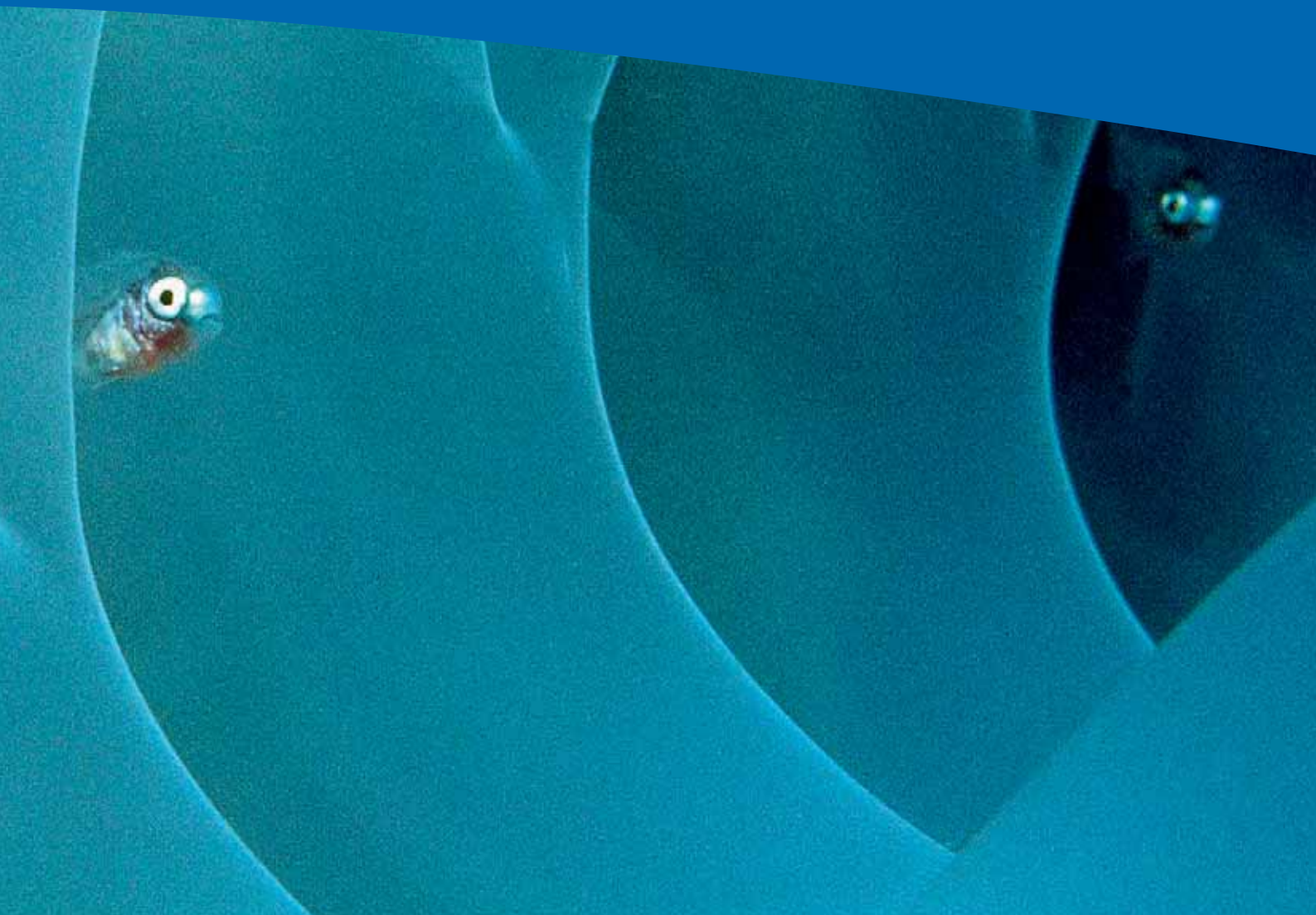

making a difference
save our seas
FOUNDATION

# PROTECTING THE LAST TRUE FRONTIER



THE SEA COMPRISES OVER 70% OF THE EARTH'S SURFACE WITH A BIOLOGICAL DIVERSITY AND COMPLEXITY THAT FAR EXCEEDS THAT OF TERRESTRIAL EARTH.



# OUR WATER PLANET

**Can you remember the first time you saw the sea: the waves crashing on the beach and water stretching far away to the horizon? The Founder of Save Our Seas Foundation (SOSF), born in the heart of the desert, caught his first glimpse of the ocean as a boy and fell in love with the seas and the magical other world that they revealed.**

That single moment led to a life-time's fascination – since then, he has spent most of his life near or underneath the water, exploring the great oceans of the world and discovering the marine creatures that inhabit them. Passionate about this underwater world to which we owe so much and yet know so little about, his wish was to give something back, to nurture and invest for future generations. Establishing SOSF, a marine conservation charity, was the fulfilment of that dream.

SOSF is well respected for the innovative and pioneering marine research work that it has supported and undertaken. It has helped to create awareness around issues of pollution, over fishing, land reclamation and climate change, and is fully engaged with educating children about the role they have to play in preserving the oceans.

# SAVE OUR SEAS FOUNDATION – HOW ONE MAN'S VISION BECAME A REALITY.

# TROUBLED WATERS

**A billion people a year rely on the sea for their daily food source. In another 10 to 20 years, millions more will depend on this same resource. At the current fishing rate, there will be far less ocean life to sustain a much higher world population. Technology has accelerated, increasing the commercial fishing industry's ability to locate and harvest vast amounts of fish stock. The techniques employed are often cruel and indiscriminate: long lines and drift nets are amongst the most insidious killers of sea life. They snare everything that falls within their path from sea lions and dolphins to rare basking sharks and even endangered whales. The practice of shark finning (removing the fins for food) has skyrocketed and the World Wildlife Federation estimates that up to 100 million sharks are killed every year.**

Alongside this, the pollution of our ocean waters is destroying marine habitats, threatening the very existence of many species. Bound up in this cycle are the vast quantities of krill, tiny planktonic crustaceans, that provide a vital link in the global food chain to feed some of the largest and smallest creatures in the sea. Eliminating any of these food sources creates devastating consequences.

The effects of climate change have already been well documented with unusually high sea temperatures destroying coral reefs and vast numbers of fish. The tsunami, that hit Asia in late 2004, had a devastating effect on the lives of the people of the area and again highlighted the need to protect and preserve the marine environment. All the evidence suggests that the impact was much worse where the healthy mangroves and coral reefs – natural defences – had been destroyed or degraded by irresponsible coastal development for industry or tourism.

In February 2005, the Kyoto Agreement came in effect with a commitment to reduce green-house gas emissions to less than that of 1990; bringing global pollution down 5.2% by 2012. It is hoped that this will help to reverse, or at least halt, the damage done to date.

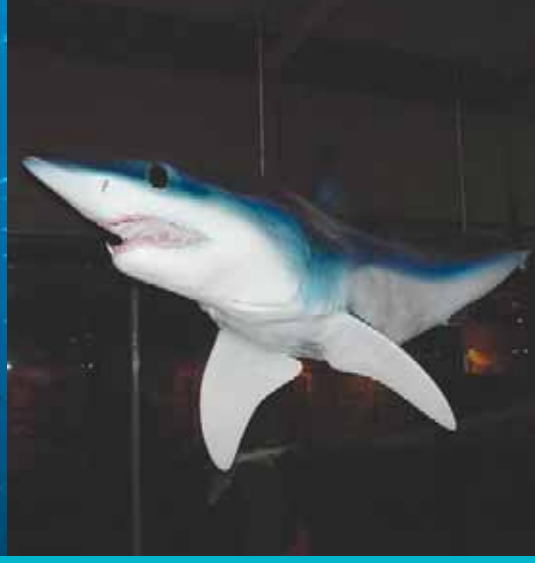
During the summer of 2006, a joint report from the United Nations Environment Program (UNEP) and the World Conservation Union (IUCN) called on governments to take swift and wide-ranging actions to conserve the world's entire marine environment amid fears that humankind's exploitation of the deep seas and open oceans is rapidly passing the point of no return. "Well over 60% of the marine world and its rich biodiversity, found beyond the limits of national jurisdiction, is

vulnerable and at increasing risk," said Ibrahim Thiaw, Acting Director General of IUCN. "Governments must urgently develop the guidelines, rules and actions needed to bridge this gulf. Otherwise we stand to lose and to irrevocably damage unique wildlife and critical ecosystems, many of which moderate our very existence on the planet."

In 2007, the Intergovernmental Panel on Climate Change reported unequivocal warming of the climate system, causing rising sea levels and water temperatures with devastating effects on the marine environment.

Whilst this confirms what biologists and environmentalist have been saying for many years now, this focus on raising the public's awareness of the impact and effect that fisheries, pollution and global climate change are having on the marine world can only bring about positive change. It is not the politicians who drive the agenda for preserving and conserving the planet, but rather the people – knowing that we all have the ability to make a difference by the actions we take every day.





SOSF HAS ESTABLISHED A SOUND AND STABLE PROJECT PORTFOLIO IN A BROAD SPECTRUM OF MARINE AREAS

# MAKING A DIFFERENCE

**From six inaugural projects initiated in 2002, SOSF has to date funded over 55 projects in 30 countries around the world – an incredible result in such a short space of time. SOSF Executive Director, Chris Clarke talks about how this has been achieved and about future plans that will build on the success so far.**

Research into the ecology of the silky shark within the Red Sea was the first project, formed in conjunction with the University of London. Today this has grown into an invaluable global database. The Red Sea, as the world's youngest ocean (at just over five million years old), is a unique and diverse marine environment, covering over 440,000 square kilometers. Having survived major ice ages and large variations in sea levels, the studies within the Red Sea also highlighted the rapid decline of its reef-building corals. The Red Sea is home to a myriad of marine species, including a variety of pelagic fish and apex predators such as silky sharks not generally seen around inshore reefs. The quality and stability of the reef ecosystem is being damaged by a combination of over-fishing, commercial development, pollution and global warming.

"This project brought together a number of things that have become central to the work that SOSF strives to achieve: contributing to the bigger picture in terms of global marine conservation and showing that, by our actions, we can help to make a difference. By raising awareness and implementing initiatives about the plight of the Red Sea coral reefs among the local community, SOSF has helped to establish a marine protected area.

In 2000, through contacts made during global diving expeditions, financial support was provided to enable the satellite tagging and DNA sampling of the giant manta rays (*Manta birostris*) off the coast of Mexico to help determine migratory patterns and the impact of fishing on this species.

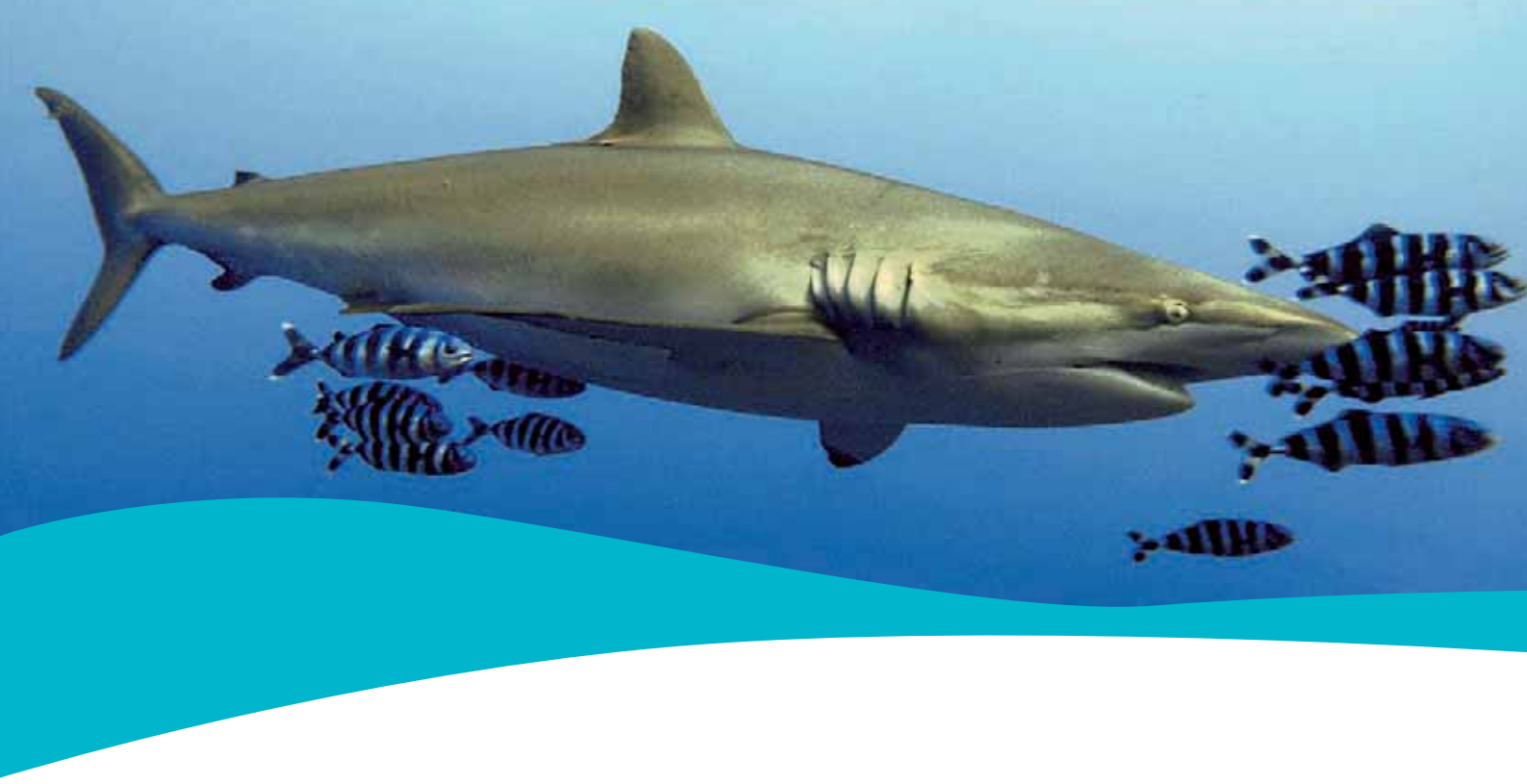
In the Iziko South African Museum in Cape Town, we supported a large 'Sharkworld' exhibition, that identifies the origin, evolution and diversity of sharks worldwide. It provides key information to help dispel the numerous negative myths about their behavior.

We provided a long-range performance patrol boat that has enabled the park rangers patrolling the Cocos Island Marine Reserve, off the coast of Costa Rica, to dramatically reduce the illegal fishing of the scalloped hammerhead sharks (*Sphyrna lewini*) that frequent the waters.

We financed the M-Sea marine science education and awareness campaign, releasing a ragged tooth shark (*Carcharias taurus*), from the Two Oceans Aquarium in South Africa, back into the wild with satellite tracking equipment that provided information about the migration and habits of the ragged tooth sharks living in African waters.

Financial support was also provided for a research doctorate into the behavioral ecology of white sharks (*Carcharadon carcharias*) in False Bay, South Africa in order to gain insights into and help establish guidelines for the protection of this endangered species.

These projects marked the first stages in promoting the importance of preserving our fragile marine ecology. The founder could see the importance of scientific knowledge in informing and influencing governments, industry and



the public about the need for better protection of both marine creatures and their habitats. Establishing SOSF has enabled him to leave a lasting legacy for future generations.

In September 2003, SOSF was officially registered as a Swiss foundation, with headquarters in Geneva, Switzerland. The mission statement for the organization: 'Awareness, protection, preservation and conservation of the global marine environment' is at the heart of the projects that we initialize and support.

Any proposals that fulfil the key objectives of the mission statement are considered – the Founder himself is involved in this process and he is supported by an advisory committee of specialists, each with their own particular area of marine expertise. Every project is reviewed on its own merit. Proposals with a strong scientific basis for research and a component to educate and raise awareness among children are most likely to receive funding from the SOSF Board.

As the scope of SOSF work has broadened, the number of potential projects requesting financial backing has increased. On average, SOSF now receives some 200 proposals for funds annually. All projects are monitored with regular reporting and feedback to ensure that they are fulfilling their agreed targets. SOSF has earned a great deal of respect both because of its professionalism, and the quality of the projects supported.

SOSF is now trademarked and registered around the world. We have established ourselves as an organization with a sound scientific base through the projects and the invaluable data that they are feeding into scientific and environmental research networks. Our websites provide a substantial bank of information: for general interest; for researchers; for teachers and for children and teenagers to make them more aware of the amazing underwater world on their doorsteps and how they can help protect it.

Alongside its funding of research into marine environmental and conservation issues, SOSF's investment in expanding educational programs is also fundamental. Raising awareness among adults about pollution and over-fishing is important but, perhaps more crucially, instilling the right attitude towards the use and abuse of the planet's natural resources from an early age will have a profound effect on the future. Educating the next generation about their responsibilities for the oceans is an important part of the Founder's philosophy.

His astute and visionary perception was evident as far back as 1998, when he began documenting the extraordinary marine world using cutting edge High Definition(HD) video. This format is the highest quality digital video currently available; the technology vastly improves the clarity of images captured underwater. It has since been used to record the various SOSF research projects being undertaken around the world. To date, we have accumulated over 500 hours of HD footage. Some of this footage has been used to create stunning documentaries, winning acclaim and awards at international film festivals and environmental conferences.

## Advisory committee

**Dr Rupert Ormond** – well-known marine ecologist, former director of the London University Marine Biological Station and now the chief scientific officer of the SOSF.

**Tom Campbell** – acclaimed award-winning cinematographer who has helped the Founder pioneer the use of HD in underwater filming.

**Dr Leonard Compagno** – curator of fishes at Iziko South African Museum and chief scientist of the Shark Research Center, South Africa.

**Dr Robert Rubin** – professor of biology at Santa Rosa Community College, California, USA who has conducted pioneering fieldwork into the ecology of manta rays.

**Carl Lundin** – head of global marine program, IUCN, World Conservation Union, Switzerland

**Hagen Schmid** – author, marine photographer and conservationist, Germany

**Rupert Ormond, SOSF chief scientific officer**

Documentaries are one way in which we have been able to get the message about SOSF and marine conservation to a wider audience. What has become apparent is the lack of knowledge and even misinformation that the general public has about many marine creatures. This is something SOSF is also trying to rectify. A documentary, made in conjunction with WildAid in China, about the decimation of the shark populations to meet the demand for shark-fin soup (a Chinese delicacy), reached an estimated 200 million viewers in China. Going forward, fulltime HD production is definitely on the agenda as a means of reaching more people through the internet and sites like *YouTube* where numerous SOSF podcasts are already available.

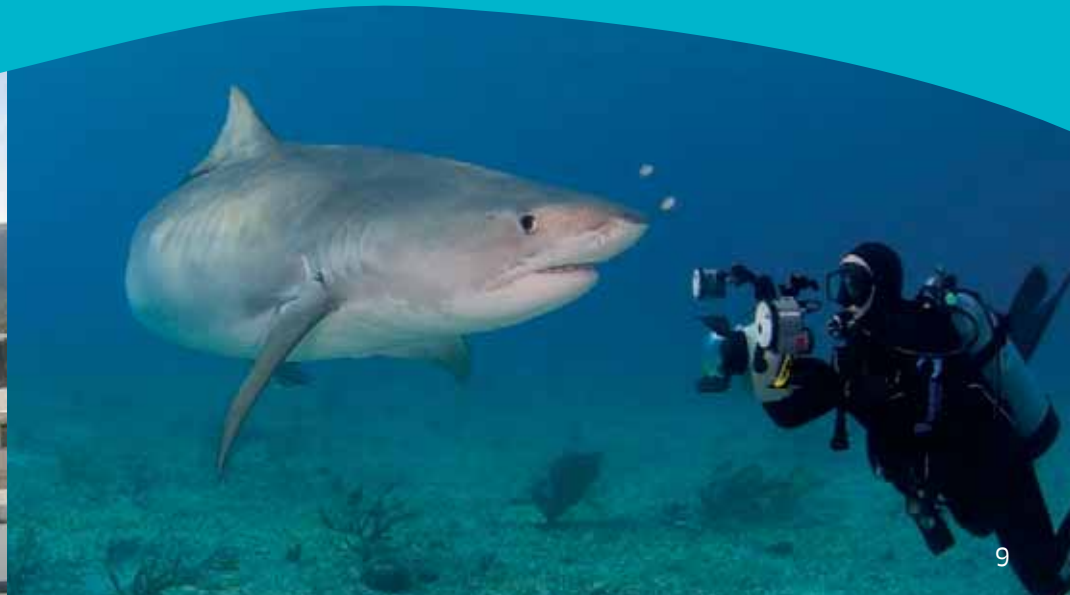
Unlike many other small organizations that need to devote huge amounts of their time and energy to raise funds, the generous financial support of the Founder has given SOSF the freedom to pursue and focus on the goals set out in the mission statement. This in turn has enabled us to promote and build awareness far more rapidly than would otherwise have been possible.

Over the last year, we have begun to see collaborations among our project leaders around the world-pooling research and sharing technology and information to highlight global trends and migration patterns of marine species – something that is almost unheard of in scientific circles. There is also a noticeable change in people's perceptions about the marine environment – although there's obviously still a lot more to do. I'd like to think that SOSF has contributed to this increased awareness. What is also encouraging is the number of other companies and organisations that we work with who share our passion for the need to protect our fragile marine environment.

SOSF now has a sound and stable project portfolio in a broad spectrum of marine areas. Our future projects will focus more on sharks and rays; as apex predators, they are indicators of the health of our oceans. The Save Our Seas Shark Research Centre has been established in South Africa to co-ordinate the needs of our global research scientists. We plan to showcase the work of the Foundation by hosting a scientific symposium in 2008 to mark the grand opening of the Centre.

New SOSF branches are also being established in the Seychelles and Austria. Ambitious developments are also in the pipeline for the next 3-5 years with offices planned for America and the UK. To facilitate our global expansion, external donations from key sponsors will now be accepted. The Founder's dream has certainly become a living reality providing a positive legacy for future generations.

**Chris Clarke, SOSF Executive Director**


# SAVE OUR SEAS FOUNDATION AROUND THE WORLD

## AUSTRALIA

**① Sevengill shark in Australia**

This PhD study, financed by SOSF explores the interaction of the sevengill shark (*Notorynchus cepedianus*) with the fisheries in the Tasmanian inshore ecosystem.

## BAHAMAS

**② Bull sharks in the Bahamas**

Tagging of bull sharks (*Carcharhinus leucas*) has helped to reveal and protect the breeding grounds in the coastal waters of the Bahamas.

## CHINA

**③ SOSF on Chinese television**

China is one of the biggest consumers of shark-fin products. An SOSF television special, co-produced with WildAid to highlight the need for conservation, reached an audience of some 200 million people.

## COSTA RICA

**④ Protecting hammerhead sharks in Costa Rica**

Providing a patrol boat for the Costa Rica Parks Authority of Cocos Island, a nature reserve off the coast of Costa Rica, to help protect scalloped hammerhead sharks (*Sphyrna lewini*).


## EUROPE

**⑤ Improving water quality in Europe and North America**

SOSF has commissioned an indepth study of experimental research into the use of cultured bivalves as biofilters for improving water quality with a view to possibly funding further research.

## FIJI

**⑥ Bull sharks in Fiji**

Tagging of bull sharks (*Carcharhinus leucas*) has helped to reveal and protect the breeding grounds in the coastal waters of Fiji.

## IRELAND

**⑦ Grey seals in Ireland**

SOSF funding will adapt this award-winning film for viewing by children. It tells the story of a seal colony on Blasket Island in County Kerry, *Grey seals – Life on the edge*.

## MALDIVES

**⑧ Manta rays in the Maldives**

The protection and understanding of the manta ray (*Manta birostris*) and its habitat are key to the development of the recreational diving and tourist industry of the Republic of Maldives.

## MEXICO

**⑨ Giant manta ray migration in Mexico**
Supporting research trips to satellite tag and collect DNA samples from the giant manta rays (*Manta birostris*) in a remote area off the coast of Mexico.

**⑩ Saving the turtle dance**
Documenting in HD, the extraordinary story of the rare Kemp's Ridley (*Lepidochelys kempi*) sea turtle and a US/Mexican partnership to protect it.

**⑪ Whale sharks of Holbox**
Teenage filmmaker, Michael Wham is already winning awards for his cinematography, including SOSF-funded *Whale sharks of Holbox*, filmed off the coast of Mexico.

**⑫ Whale sharks in the Sea of Cortez**
Providing a research boat to continue the study of the whale sharks (*Rhincodon typus*) from the Gulf of California, off the Mexican coast, This project is focused on population structure using genetics and photo-ID. The information is contributing to the tourist management for the species.

## MOZAMBIQUE

**⑬ Indo-Pacific Humpback Dolphins in Mozambique**
SOSF research monitored the population and behavior of the rare humpback dolphins (*Sousa chinensis*) that inhabit the waters around Inhaca Island, Mozambique.

**⑭ Manta rays in Mozambique**
A five-year doctoral study, funded by SOSF, exploring the population dynamics and reproductive behavior of the giant manta rays (*Manta birostris*) off the coast of Mozambique.

**⑮ Whale sharks of Mozambique**
A long-term study of the residency patterns, feeding ecology, migratory linkages and conservation requirements of whale sharks in Mozambican waters.

## SAUDI ARABIA

**⑯ Creating a marine protected area in the Red Sea, Saudi Arabia**
Creating a natural reserve in the Red Sea, off the coast of Jeddah, Saudi Arabia with extensive research projects into the ecology of reef fauna and flora.

**⑰ Silky shark in Saudi Arabia**
Funding a postgraduate study (in conjunction with London University) on the tagging, migration, behavior and population dynamics of the little known silky shark (*Carcharhinus falciformis*).

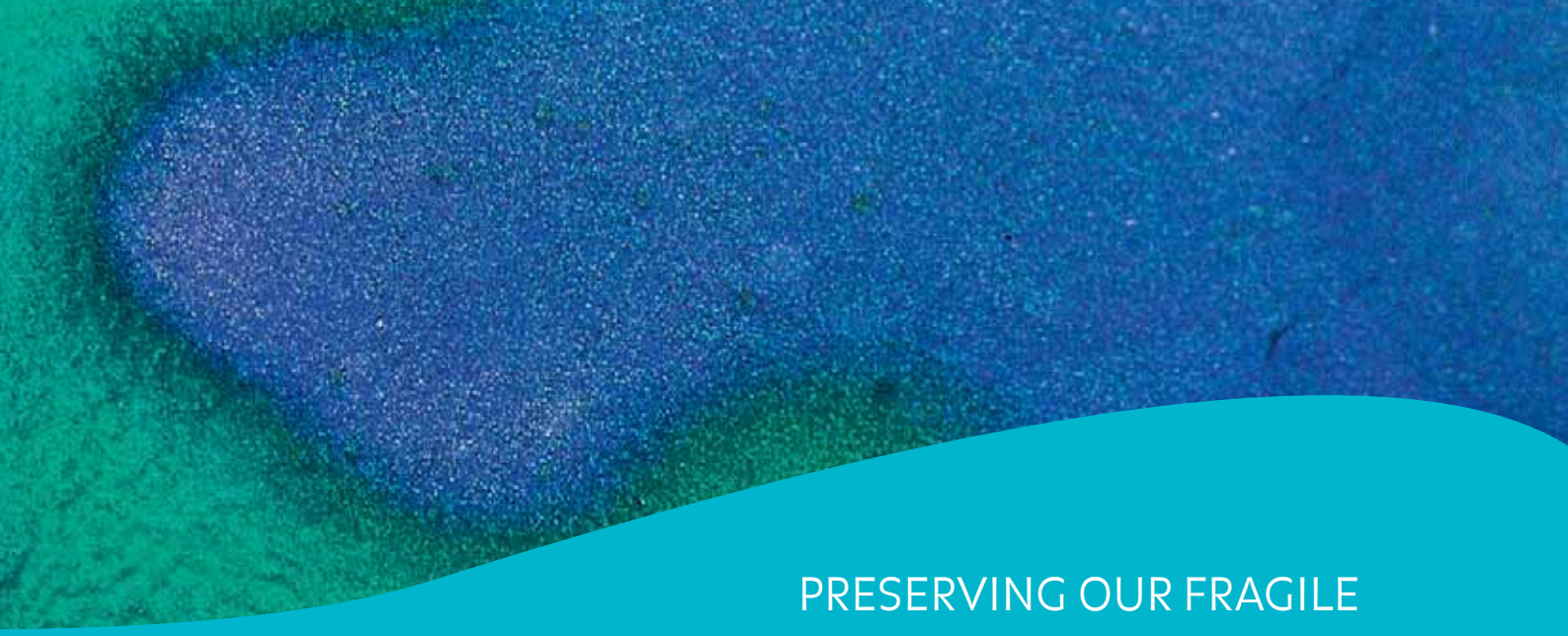
## SEYCHELLES

**⑱ Whale sharks in the Seychelles**
This project studies the occurrence, behaviour and conservation biology of whale shark (*Rhincodon typus*) in Seychelles waters, with a view to developing a management strategy for the species .

## SOUTH AFRICA

**⑲ Sharkworld at the South African Museum of Natural History**
Sponsorship of Sharkworld, a modern new gallery and audio visual theater at the South African Museum of Natural History in Cape Town, South Africa.

**⑳ Releasing Maxine, Cape Town**
Releasing Maxine, a ragged tooth shark (*Carcharias taurus*), from the Two Oceans Aquarium in South Africa into the sea in 2004. Her release (satellite-tagged) back into the wild was also told in a documentary sponsored by SOSF and led to the establishment of Maxine Science, Education & Awareness Project (M-Sea), aimed at educating children about the challenges facing marine life.



# PRESERVING OUR FRAGILE MARINE ECOLOGY

㉑ **Behavioral ecology of great white sharks**
White shark (*Carcharodon carcharias*) conservation in Cape Town, a collaborative research program researching multiple facets of white shark behavior and ecology.

㉒ **Tiger sharks off the Kwazulu-Natal Coast**
This study aims to understand the behavior, movements and residency patterns of tiger sharks, (*Galeocerdo cuvier*), primarily based off a reef 50km south of Durban, the Aliwal Shoal.

## SPAIN/PORTUGAL

㉓ **Shortfin mako shark in the Atlantic**
Determining the shortfin mako shark (*Isurus oxyrinchus*) distribution in relation to longlining and gillnetting operations off the coasts of Spain and Portugal.

## UAE

㉔ **The Dugongs of Abu Dhabi**
An award-winning film, *The Dugongs of Abu Dhabi*, showcases the steps that have been made in the UAE to preserve the dugongs and the seagrass beds that they feed on.

## UK

㉕ **Basking shark conservation in Scotland**
A study, focusing on the basking shark (*Cetorhinus maximus*) population along the west coast of Scotland, will provide key information for species conservation and management.

㉖ **Blue sharks in the North-east Atlantic**
A three-year study into blue shark (*Prionace glauca*) movements, in the Atlantic began with tagging in the English Channel in 2006.

㉗ **Be WiSe in the UK**
SOSF funded the production of a DVD by WiSe (Wildlife Safe) to raise awareness of 'mega' marine life such as seals, dolphins and basking sharks.

㉘ **Lobsters go wild in Cornwall**
SOSF is supporting an innovative program at the National Lobster Hatchery in Cornwall, UK that plans to rear and release over 5,000 juvenile lobsters to the local environment with the active involvement of local fishermen.

㉙ **Partnership with the London Aquarium**
SOSF has established a mutually beneficial relationship with the London Aquarium, using it as a highly effective distribution channel for SOSF literature whilst also sponsoring a permanent underwater photographic exhibition.

## US

㉚ **Bringing the ocean to the land**
SOSF sponsored SisBro in the production of a children's video documentary that brings the wonders of the ocean to the children of the landlocked mid-west regions of the US.

㉛ **Siren Song – Manatees in Peril**
The SOSF-sponsored an award-winning film, *Siren Song: Manatees in Peril,* produced in English and Spanish, to raise awareness of the plight of the manatee (*Trichechus manatus*) in Florida.

㉜ **Dive into your imagination**
This interactive DVD uses actual footage of marine animals to educate and entertain children about the colorful creatures of our oceans.

㉝ **Improving water quality**
SOSF has commissioned an indepth study of experimental research into the use of cultured bivalves as biofilters for improving water quality with a view to possibly funding further research.

㉞ **Preserving the Polynesian way of life**
On the island of Kauai in Hawaii, SOSF is supporting the creation of a marine protected area, harmonizing the needs of the local community and a thriving tourist industry with the protection of the coral reefs and a number of endangered species.

# RETHINKING THE SHARK

**By combining science, education and awareness, the SOSF M-Sea Program (M-Sea), initiated by Lesley Rochat of AfriOceans Conservation Alliance (AOCA) and supported by the Two Oceans Aquarium, aimed to make a meaningful contribution towards the conservation of Africa's sharks. Through the M-Sea's compelling multimedia approach in creating awareness, it has successfully reached over 100 million people worldwide. This success has helped to establish SOSF as a key player in the conservation of southern Africa's sharks.**

M-Sea's unique scientific research project begun with the tagging and releasing of ragged tooth sharks (*Carcharias taurus*) from the Two Oceans Aquarium in 2004. To date three sharks have successfully re-integrated into the wild after spending up to 14 years in captivity. The tagging of a further four sharks, whose tags were funded by the Aquarium, have allowed the team to compare the movements of the released sharks to that of the wild animals.

The use of satellite and ultrasonic tags, including data retrieved from ultrasonic base stations, has enabled M-Sea to build up an impressive database of previously unknown information about the migration, breeding and general behavior of the ragged tooth shark. This new insight was instrumental in the successful submission made by AOCA, Dr Leonard Compagno and SOSF to revise the status of the ragged tooth shark on the IUCN Red List to 'vulnerable' in South Africa and a worldwide upgrading to 'endangered'.

To increase public awareness M-Sea launched a SOSF Rethink the Shark campaign in Cape Town, South Africa. It targeted summer holidaymakers, aiming to put shark bites into perspective by using the compelling Rethink the Shark concept created for M-Sea by advertising agency, Saatchi & Saatchi, who are working pro-bono for SOSF in South Africa. Over a million people were reached via a mobile billboard, the screening of three Rethink the Shark TV commercials, posters and peak caps handed to 40,000 beach-goers, and a high profile SOSF Rethink the Shark newspaper competition and editorial campaign.

Additionally, M-Sea is running numerous ongoing outreach programs targeting children and teachers: a Two Oceans Aquarium teacher provides lessons to children and workshops to teachers at remote coastal schools, whose children are the future fishers of the sea; another program for disadvantaged children is being run in Gansbaai, the white shark cage diving centre of South Africa. This program allows children a unique opportunity see the kings of the sea up close and personal, thus instilling enduring awareness.

M-Sea is also involved in the exciting Edutrain, a classroom on wheels that runs along the coast in False Bay, home to the white shark, exposing children to places beyond their normal reach. In a partnership with the City of Cape, M-Sea's marine educationalist is giving lessons on sharks to groups of up to 100 children at a time. Curriculum-linked educational materials are distributed to teachers for use in the classroom. These include a *Teacher Handbook on Sharks*, a poster entitled *Sensitive Sharks in Deep Trouble*, and a DVD documentary, *Maxine's Journey*, about the first ragged tooth shark released from the Aquarium. Other SOSF educational material is also distributed.

To further expand awareness, M-Sea participates in public festivals, runs satellite tag competitions and has produced three permanent shark displays at the Aquarium: Kiddies Maxine the Shark display, SOSF M-Sea program display and the Splendour of Sharks display. These are seen by 410,000 visitors a year, of which 110,000 are children.

Expanding on the M-Sea Shark Encounter signage, which is on all beaches in Cape Town and Gansbaai, a new sign called Save Our Sharks, is being developed for all major harbors in the western Cape. This sign targets fishers, a group posing a great threat to shark populations, especially to inshore and endemic species that are being threatened by increased fishing pressure.

The AOCA website continues to serve as the main communication link about the M-Sea Programme both locally and internationally. It has a dedicated children's section, enables downloading of valuable educational material and also promotes SOSF.

Through M-Sea's educational and awareness programs, the positive media exposure covered in magazines, newspapers, internet, television and radio has been remarkable. Other non-profit organisations, such as WWF, report that there has been a significant and encouraging shift in attitude towards sharks along the South African coastline and attributes this to M-Sea's efforts. M-Sea project leader, Lesley Rochat, has been elected an advisor for education and awareness as part of Cape Town's Shark Working Group, formed to address concerns about shark encounters.

**Lesley Rochat, M-Sea project leader**

## THE SOSF M-SEA PROGRAM COMBINES SCIENCE, EDUCATION AND AWARENESS

THE WORLD CONSERVATION UNION LISTS MANTA RAYS AS ‘NEAR-THREATENED’. POPULATIONS AROUND THE WORLD ARE SEVERELY DEPLETED, BUT ALMOST NOTHING IS KNOWN ABOUT THEIR POPULATION ECOLOGY, USE OF CRITICAL HABITAT, MOVEMENTS OR REPRODUCTION – ALL OF WHICH ARE CRUCUIAL TO ACCURATELY ASSESSING THE STATE OF THE SPECIES.

# MAJORING ON MANTAS

**The World Conservation Union (IUCN) currently lists manta rays (*Manta birostris*) as 'near threatened'. It's known that several populations around the world are severely depleted, but not enough scientific work has been carried out to properly assess this species as a whole. Almost nothing is known about their population ecology, use of critical habitat, movements or reproduction, all of which are important in order to accurately assess the state of the species. What is clear are some of the threats that mantas face: drift nets and long lines entangle and kill mantas, mainly as a by-catch of the intended target fisheries; in the Philippines, Mexico and Indonesia, manta fisheries have decimated local populations.**

SOSF is already at the forefront of manta ray research with the funding of three major projects. Dr Robert Rubin (marine ecology specialist and Professor of Biology at the Santa Rosa Community College in California) has carried out pioneering fieldwork into the population dynamics of manta rays off the coast of Mexico. Across the other side of the world, in Mozambique, Andrea Marshall is conducting a five-year research project among the manta rays along this African coastline, with a particular focus on the philopatry (the tendency for an animal to return to or stay in a particular locality). The third project is underway in the Maldives, which also draws on and collaborates with the research already undertaken to help provide a much bigger body of knowledge about the manta ray and its habitat.

**Andrea Marshall, project leader in Mozambique**

## Mozambique

SOSF is funding a five-year project to enable Andrea Marshall to carry out an in-depth study of the biology and behavior of the manta rays. As part of her PhD thesis for the University of Queensland, her research efforts have already provided a platform to set up a larger research group in the area, which is helping to combat illegal shark fishing off the coast of Mozambique.

Her team is forging new ground working with local tourism officials and maritime officers to initiate change in Mozambique. As a result of hunting and war, large land animals are scarce in this country. This costs the country millions in lost tourism revenue each year as it is bypassed by the 'safari circuit'. However, Mozambique may have one of the largest populations of mantas and whale sharks in the world, presenting a major addition to ecotourism in southern Africa and a point of difference for Mozambique itself.

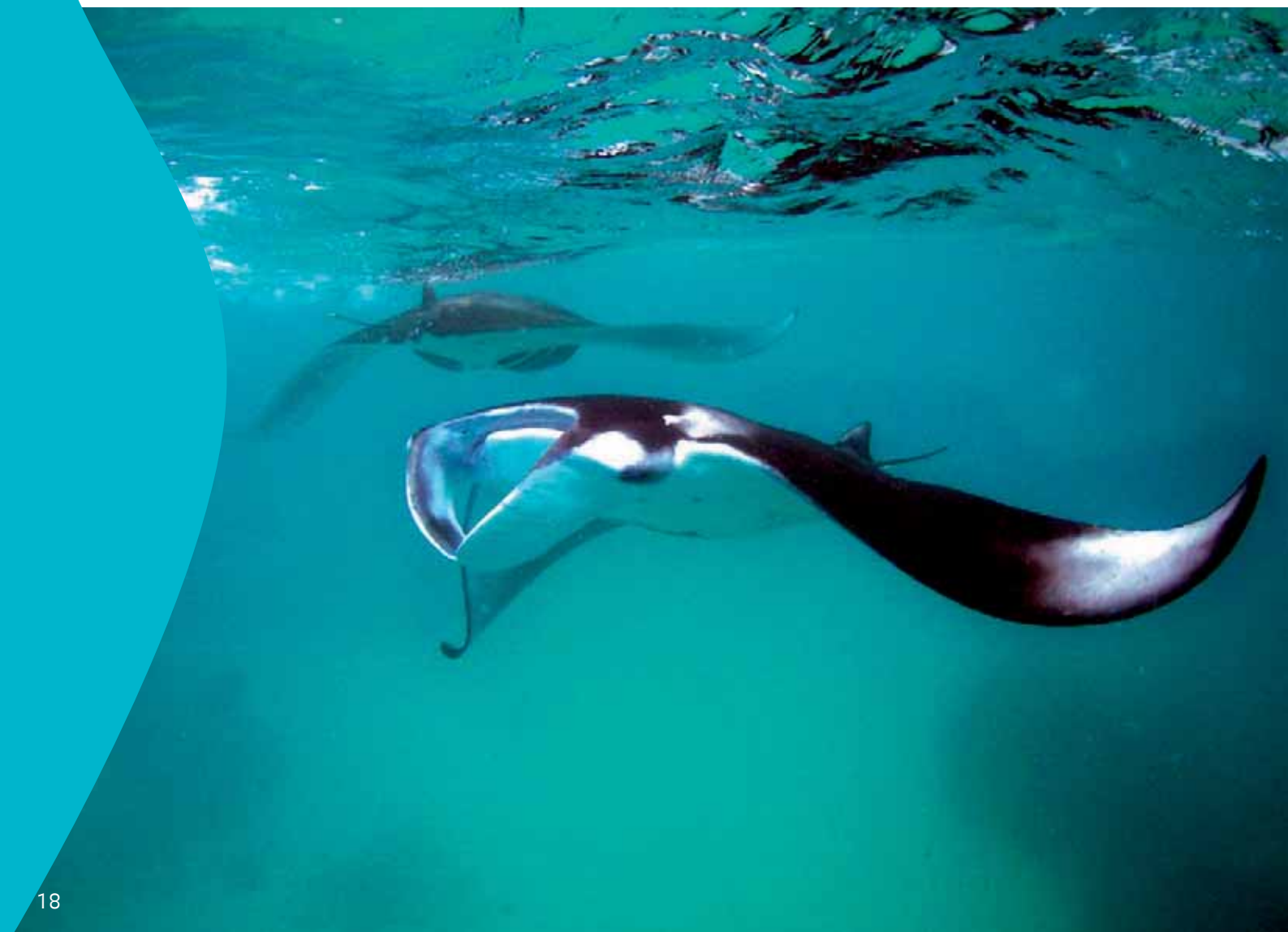
These massive fish are now the focus of a growing tourism industry in the south of the country, providing much-needed employment to the Mozambican people. The Manta Ray & Whale Shark Research Group is conducting world-leading research on the ecology and conservation of mantas and whale sharks. Their scientific programs examine issues directly related to both the continued survival of these species, and the promotion of a sustainable tourism industry.

Andrea and her team also continue to use this data to put pressure on illegal shark fishing activities and promote their conservation worldwide. With the help of the new SOSF-dedicated research boat, they have been able to assist local government officials in banning and confiscating local long-lines and gill nets, which unsustainably kill hundreds of sharks and rays (including mantas) each month.

Continued efforts have also seen the Mozambican Manta Ray Identification Database rise to 515 individuals. It remains one of the largest and most in-depth, scientifically recorded manta databases in the world. Re-sighting events are common but new individuals are still regularly sighted. Five years of detailed research has additionally shed light on many aspects of their reproductive biology and behavior previously unknown for this species.

Acoustic tagging equipment and listening stations sponsored by SOSF enable Andrea to examine how individual manta rays use critical habitats, like cleaning stations, along the coastline. This part of the program is to be expanded in future years to ensure eco-tourism is expanded responsibly along this coastline with minimal impact to the manta rays.

The collection of genetic samples of the entire local manta population is additionally underway. Cutting edge genetic research in conjunction with researchers at the University of Queensland is planned which will primarily focus on the relatedness of this local population (something that has not been attempted before in mantas). With the assistance of SOSF, Andrea is also conducting comparative research and collecting genetics samples in Mexico, Japan, Yap, Thailand, Indonesia and Australia.



## Maldives

The Republic of Maldives has a large population of manta rays. It is estimated that the total population for this small country in the middle of the Indian Ocean exceeds tens of thousands of individuals. In two years of data collection, the Maldivian Manta Ray Project has already identified well over 800 different mantas with new individuals being sighted on a regular basis.

Maldivian mantas are year-round residents, migrating across the country's 26 atolls with the changing monsoons as they follow the seasonal shift in their planktonic food source. These nutrient rich waters support huge quantities of marine life and it's not uncommon to find over 100 manta rays feeding in the shallow surface waters together with half a dozen whale sharks.

MALDIVIAN MANTAS ARE YEAR-ROUND RESIDENTS, MIGRATING ACROSS THE COUNTRY'S 26 ATOLLS.

This abundance of marine life has made the Maldives one of the top dive destinations in the world and manta rays continue to be one of the 'must sees' for most of its visitors. Manta rays are therefore extremely important to tourism in the Maldives, which is by far the largest source of revenue for the country. However, despite this, manta rays are not yet specifically protected under Maldivian law and, as natural resources continue to be stretched in this developing nation, the negative associated impacts are increasingly affecting the manta population.

The Maldivian Manta Ray Project is a non-profit research, conservation and education organisation based at the Four Seasons Resorts in the Maldives. The project was founded by marine biologists Guy and Kate Stevens in 2005 to undertake research on all aspects of the Maldivian manta ray population, while also working with the government, resort guests, local communities and other visitors to the Maldives to create greater awareness and understanding of these graceful rays. As well as this, Guy also manages a wide variety of other marine conservation and educational initiatives within Four Seasons Marine Research Centre.

One of the key aspects of the project work is to continuously expand its comprehensive database of individual manta rays using photo and video identification. Each manta has a unique spot pattern on its underside, enabling plotting of population migration routes, estimate the population size and track individual's movements spatially and temporally.

**Guy Stevens, project leader in the Maldives**

Another key aspect of the projects work is to document the reproductive cycle of these amazing animals. Certain study areas in the Maldives have clear mating seasons enabling the project to document the courtship, mating and pregnancies of the sites population. Following the lives of individuals from year to year, the project is shedding new light onto the little known sex lives of the manta ray.

With the support of SOSF the project has also recently begun acoustically tracking mantas. Using active pinger tags, the project recently managed to track one female continuously for four days and three nights, following her as she moved around her home range visiting cleaning and feeding sites. The project was also then able to deploy a number of permanent listening stations at some of these cleaning and feeding sites and tag more mantas with acoustic tags to record their visitations to these sites over the following months and years.

Through further tracking of more individuals over the coming years, the project hopes to identify those areas which are of critical importance to the local manta population, and will build a better picture of the species' overall habitat utilization in the Maldives and so determine those areas that are most in need of protection.

# LETTING GO OF LOBSTERS

Dominic Boothroyd, general manager at the National Lobster Hatchery and project manager

**SOSF is funding a UK project at the National Lobster Hatchery (NLH) in Padstow, Cornwall aimed at increasing the involvement of local fishermen in the release of hatchery-reared juvenile lobsters into the wild. The year-long project is allowing the hatchery to release a significant proportion of its juvenile lobsters into active fisheries throughout Cornwall; this is an important step in the progress of the hatchery's stock enhancement program.**

The general manager at NLH, Dominic Boothroyd, is keen to encourage the fishing community to adopt a 'farming', rather than a 'hunter gatherer', attitude; the hatchery promotes and supports sustainable fishing practices. The project is developing methods currently employed for releases at sea, which will enable fishermen to release lobsters in their fishing creels or holding cages as part of their everyday working routines, whilst providing lobsters with the best chance of survival in their favored habitats.

The reaction from industry has been very encouraging with fishermen from 14 ports around the county volunteering to help with the project. Ten boats have already (only six months into the project) released over 4,000 juveniles around the coast. (The plan is to rear and release over 5,000 juvenile lobsters during the year.) Press coverage of the work has been extensive and consequently fishermen have taken a much greater interest in the work of the NLH, which in turn has helped achieve even more success than anticipated. An entirely new time release system is currently under development by the hatchery team; this will help enormously with the aim of continued and sustained stakeholder involvement.

# DIVE INTO YOUR IMAGINATION

**Underwater photographer and film maker, Annie Crawley follows up her 2006-SOSF funded project (DVD for children 8-10 years) with a DVD on ocean life and marine conservation for a younger audience (4-6 years). *Dive into your Imagination* is a sequel to *Ocean Life, A to Z* targeting younger children and their parents. The well-edited, music-filled and image-driven educational DVD addresses children in both English and Spanish, reaching a tremendous audience, at an impressionable age, with a strong conservation mission promoting the SOSF.**

This DVD has the potential to reach hundreds of thousands of ocean enthusiasts because of the distribution channels developed with the first project. An immediate 75,000 DVDs were picked up and distributed by Reader's Digest, Scholastic Publishing, PADI and various other major outlets. A prominent children's book publisher has agreed to distribute her work. In addition it will be marketed through scuba associations such as PADI America, PADI International and Scuba Schools International.

**Annie Crawley, underwater filmaker and project leader**

# INTERNATIONAL RECOGNITION FOR WHITE SHARK RESEARCH

**The False Bay White Shark Ecology Project has been an unprecedented success story. Now in its fourth year of funding by SOSF, Alison Kock and her team of fellow researchers from Iziko Museums of Cape Town, Department of Environmental Affairs and Tourism – Marine and Coastal Management Branch and University of Cape Town provide the only source of scientific information on white shark (*Carcharodon carcharias*) activity and behavior patterns in Cape Town. Recognition of this as a world-class resource was confirmed with the invitation to present at the American Elasmobranch Conference (AES) in New Orleans in 2006 and the first National Geographic Animal-Bourne Imaging Symposium in Washington DC in 2007, putting South Africa on the white shark research map.**

White sharks have protection status in South Africa, but protection is only as effective as the continued support of this status by policy makers and enforcement of this law. Rumours of poaching activities in coastal areas and evidence of interactions with fishing gear designed to catch large sharks highlight the threats white sharks still face. Habitat degradation, including the depletion of fish stocks, and the subsequent consequences for white sharks are poorly known, but are identified as a major threat, especially in coastal areas.

However, currently the main threat to white shark conservation in the Western Cape is the ongoing media feeding frenzy and consequent fear and apprehension among residents due to the perceived Jaws-like phantom menace off the beaches of Cape Town. Scientific information is needed to form the backbone for all policy and management decisions and thus the current research project is critical to the future conservation and protection of white sharks in the Western Cape.

Studying white shark behavior year-round in one particular bay in two vastly different habitats is a rare opportunity. The focus of the project has moved from concentrating around the Cape fur seal colony in the bay to the presence of sharks occurring along the inshore areas of the bay. Coastal surveys have begun to determine how many sharks are present along the inshore areas, whether they are the same sharks that are present at the island during the winter months and what the shark population structure is like.

A total of 35 acoustic receivers are deployed in False Bay with a total of 76 sharks tagged in an ongoing program. Sightings data collected from the City Of Cape Town's Shark Spotting Program will be used in conjunction with the acoustic monitoring data to get a clear pattern of white shark presence inshore.

## THE ONGOING MEDIA FEEDING FRENZY IS CURRENTLY THE MAIN THREAT TO WHITE SHARK CONSERVATION.

**Alison Kock, project leader**

# FISHERIES THREAT TO ATLANTIC BLUE SHARKS

**The population structure of blue shark (*Prionace glauca*) in the Atlantic appears complex with anecdotal evidence for migrations, age and sexual segregation and spatially discrete nursery areas. Underlying this apparent complexity is the likelihood that fisheries are significantly impacting populations. The purpose of the research in the north-east Atlantic is to determine the movements, behavior and critical habitat of blue shark populations for direct use in conservation assessment of fishery interactions.**

To date 12 pop-up archival transmitting (PAT) tags have been attached to blue sharks in three locations in the northeast Atlantic: seven in the English Channel, three in southern Portugal and two in the Azores. These tags archive pressure (depth), sea temperature and light intensity data and pop-off at pre-programed times to report summary data via polar-orbiting satellites.

By September 2007, seven out of nine tags achieved their pop-up dates and have relayed large movement and behavioral datasets. Two further tags are due to pop-up in November and December respectively. Two of the tags deployed on female sharks in English Channel have also been physically retrieved, yielding full archival datasets of depth, temperature and light at 10-second resolution, providing an unparalleled insight into the migration behavior of blue sharks.

In addition to PAT tags, 11 smart position-only tags (SPOT) were attached to the first dorsal fins of blue sharks in the same three locations. These tags accurately pinpoint the locations where sharks break the surface during normal swimming. These have provided less reliable data with only four of 11 tags reporting positions on a regular basis.

The detailed analysis of data collected, including movement paths and dive behavior, is at an early stage. Some initial results show a high degree of sexual segregation among blue sharks in the northeast Atlantic. Using the tags Dr David Sims and his team have tracked the female-only migration within and away from the English Channel and identified specific behaviors associated with foraging and migrating. Male blue sharks were more abundant further west and a male tracked from the Azores showed directed movement towards an isolated seamount; juvenile blue sharks tracked on the continental shelf of southern Portugal were also tracked moving to oceanic seamounts, suggesting that these topographic features are probably important blue shark habitats.

**Dr David Sims, project leader**

Sadly, two of the six sharks tracked with SPOT tags were captured by longlining fisheries within a month of release and tracked to ports in southern Spain with one physically retrieved. The death of these sharks reinforces the need for further research into the intersection of migratory routes with that of fisheries.

# BULL SHARKS TRAVEL THE SOUTH PACIFIC

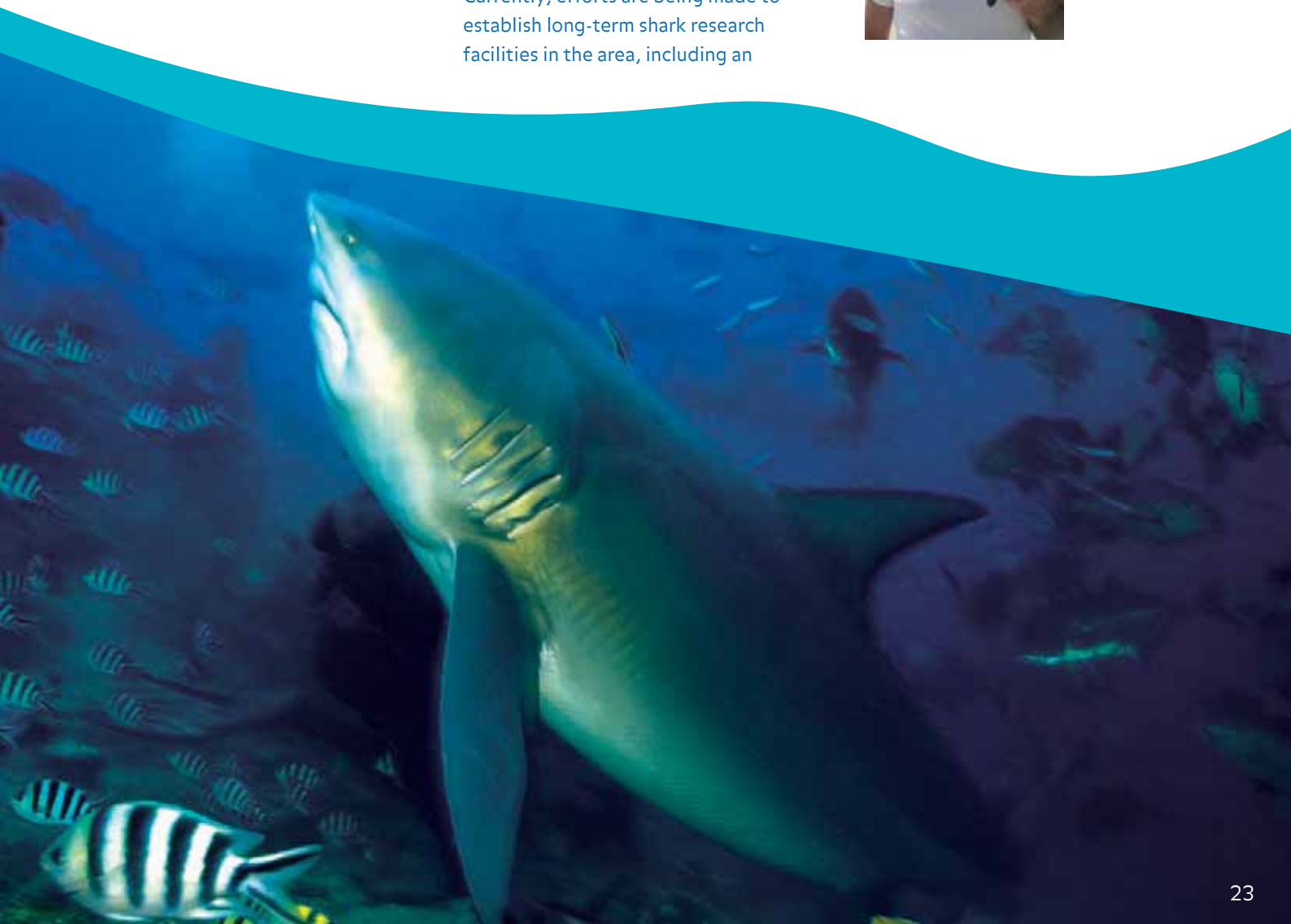
**Bull sharks (*Carcharhinus leucas*) have a worldwide distribution in coastal and freshwater habitats with frequent sightings in some areas, yet many aspects of their behavior and ecology remain unknown. With such a lack of knowledge, for example about local population structures or reproduction sites and the migratory routes to and from these areas, it is impossible to draw up any meaningful conservation plans.**

The bull shark tagging program was initiated in 2003 and has been co-funded by SOSF since 2004. The initial pilot study in the Bahamas tested the feasibility of studying movement patterns and habitat use of bull sharks with state-of-the-art pop-up satellite archival tags. The pilot study revealed that bull sharks, residing in a relatively small area close to Walker's Cay for most of the year, would leave this site in spring and travel as far as to the east coast of the US. This is the first indication of movement of bull sharks between the Bahamas and the Florida coast, underscoring the need for international co-operation.

Following the success of this pilot, a full-scale research program was set up in the South Pacific, off Fiji. Eleven bull sharks were equipped with pop-up satellite archival tags in 2004 and produced an important dataset on local and regional movement, habitat use and diving behavior which will help to better define the ecological niche of this species. Furthermore, the results were used to help create a relatively small protected area, the Shark Reef Marine Reserve, Fiji. Here up to eight different species of sharks can be encountered on a regular basis, making it an excellent reef for studying free-ranging sharks.

Currently, efforts are being made to establish long-term shark research facilities in the area, including an acoustic receiver array to track small-scale movements of various shark species. So far, only bull sharks have been fitted with transmitters to learn more about their small-scale movement patterns and to collect presence/absence data for Shark Reef Marine Reserve and surroundings. It is hoped to include other shark species that would give much needed insight into how different shark species use individual reefs over time. The results from these studies will help to maintain – and preferably enlarge – this unique reserve in the South Pacific.

**Project leader Juerg Brunnschweiler**



# GREY SEAL, LIFE ON THE EDGE

**Grey seals (*Halichoerus grypus*) are a large part of Celtic legend and have been revered in Ireland until recent times, with many people believing they were able to take human shape and live on land as Selkies. Nowadays, they are often considered a nuisance: vermin responsible for low fish catches that should be eradicated. There is a great deal of ignorance regarding their natural history and their contribution to the well-being of our seas.**

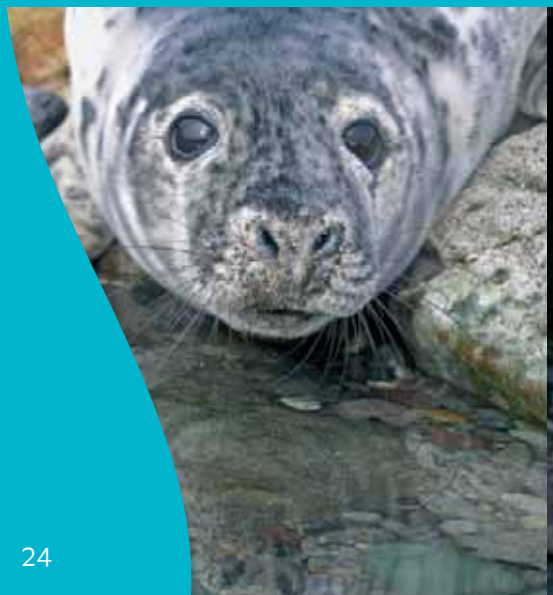
Filmmaker Jacquie Cozens spent 12-months filming the colony of grey seals on Blasket Island in County Kerry, on the west coast of Ireland. With funding and assistance from SOSF, the resulting film, *Grey seals: life on the edge*, is being adapted as a short story that is intended to inspire and educate children. The colony was subjected to a massive and illegal cull in 2004 and is perhaps right on the edge of survival unless measures are put in place to properly protect it. It is hoped that another event such as this can be prevented by influencing young people and increasing their understanding of grey seals.

In the adapted version, one of the survivors, a small pup called Charlie tells of a year of his life, from his birth as a helpless white bundle through to adulthood with all the hazards he and the other seals face along the way. Children will see that rather than being a pest blamed for low fish catches, seals have a place in the environment and should be valued as an important part of the marine ecoweb. In this way it is hoped that children will become advocates for the seals and will influence their peers and their family. They will be told about ways that they can actively help seals by, for example, visiting their local seal sanctuary, being careful about disposing of litter or getting involved in seal releases.

The film is aimed at 8-11 year olds and will be written in a fun way, using the seal's natural charisma and playfulness to bring the story to life for young people. The DVD will be distributed free to children's groups, environmental groups and schools. Most importantly the film has been accepted by the Irish Teacher's Union for use in schools throughout the country.

**Fimaker and project leader, Jacquie Cozens**

THE DVD WILL INSPIRE AND EDUCATE CHILDREN ABOUT THE GREY SEAL.



# TRACKING THE FASTEST SHARK

**The shortfin mako (*Isurus oxyrinchus*) is generally regarded as the fastest swimming shark, reaching speeds up to 30 mph. It is a warm-bodied, highly active shark with a circumglobal distribution in tropical and warm-temperate seas. However, very little is known about many aspects of its biology, including general movements, habitat preferences and population structure.**

Shortfin makos are taken as bycatch in longlining and gillnetting operations for tuna and swordfish, activities that have expanded rapidly during the last 20 years. High demand for fins and its good-quality meat mean makos are now highly prized by fishers. Because of this, population declines of around 25% have been recorded in the western Atlantic Ocean since 1986. There is some evidence that mako sharks remain faithful to particular regions, with males and females apparently segregating into different regions for at least part of the year. This may result in exposing the more vulnerable (mature females, juveniles) to greater risk and contributing to this dramatic decline.

SOSF is now funding a two-year study that will for the first time shed some light on the movements and behavior of shortfin mako sharks. The tag deployments and data analyses will be conducted in parallel with an ongoing SOSF-funded project on blue shark satellite tracking (see page 22 of this review).

State-of-the-art tracking technology will be used to determine horizontal and vertical movements of shortfin mako sharks in the Atlantic, and to identify activity spaces and migration routes of males and females. It will also track geographical positions and behavior of individual sharks to high-resolution maps of environmental variables (temperature, bathymetry, primary and secondary production, mesoscale eddies, frontal boundaries) to quantify habitat preferences.

The project team will also use GIS technology and geostatistics to plot the extent of spatial and temporal overlap of mako shark distributions (including migrations) with the start and end positions of longlines deployed by Spanish and Portuguese fishers.

Computer modelling will determine and assess the vulnerability of sharks to different fishing location and effort scenarios. In so doing, this novel two-year research programme will provide the first data on the long-term, large-scale movements and behavior of shortfin mako shark in the Atlantic Ocean.

Research began in July 2007 with a cruise to the north of the Azores aboard a commercial longliner but, due to appalling weather and low catch rates, no tagging of makos took place. In late September, during a second cruise, the first mako shark was tagged with a PAT tag off the coast of southern Portugal in the eastern Atlantic. This tag is due to release in early December 2007. Further deployments of tags from the Azores and southern Portugal are planned in summer 2008.

**Dr David Sims, project manager**

# PROTECTING THE GENTLE GIANT

**Growing to more than 20 meters long, whale sharks (*Rhincodon typus*) are the largest fish in the oceans, inhabiting tropical waters around the globe. Little is known about these gentle plankton-eating giants but their large fins and bodies attract fishermen who relentlessly kill them. In all areas of the world, whale sharks are severely threatened. Learning more about their biology and movements will help protect the species from extinction.**

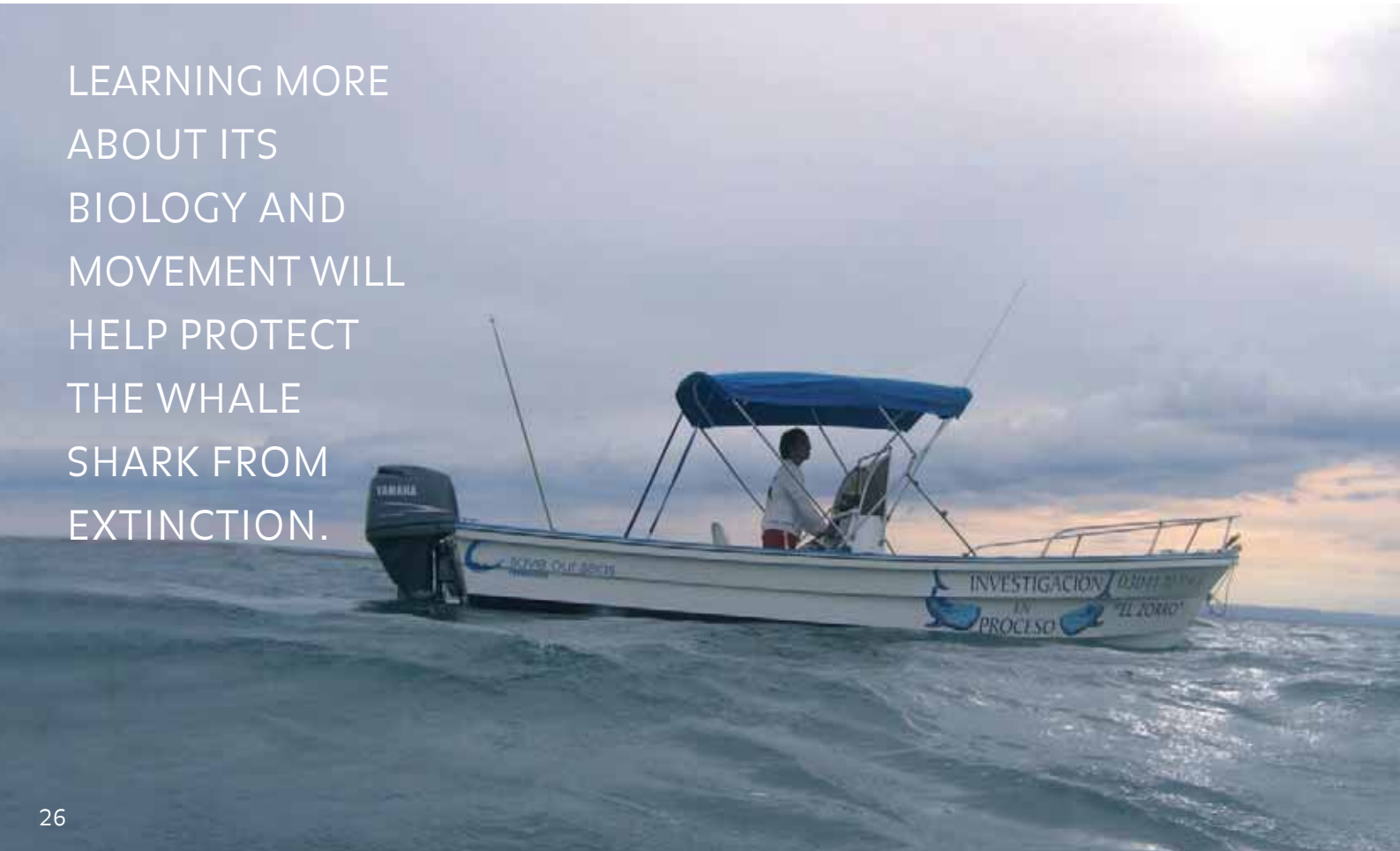
Help from SOSF has enabled filmmaker Michael Wham to highlight this in his latest production, *Whale sharks of Holbox*, which was shot off the coast of Mexico. The residents of Holbox Island, faced with a dwindling supply of fish – their main livelihood – have turned to ecotourism to support their economy. And in doing so have helped to protect the whale shark. In telling this story, 17-year-old Michael has gained yet more plaudits for his work: in the US, the film was selected for the KIDS FIRST! Film and Video Festival 2007 and also won the film division of the Culture Shapers Visual Arts Competition. With further support from SOSF, he has continued filming in Belize and Mexico during 2007.

SOSF is currently funding research projects in the Sea of Cortez, Mozambique and the Seychelles – collaboration on research and data will ensure that whale shark conservation, spearheaded by SOSF, gains global reach.

## Sea of Cortez

Very little is known about the whale sharks in Sea of Cortez (Gulf of California) and research is badly needed to understand the feeding areas, the population structures and genetic diversity of these animals in order to better protect the species. Gathering this information, and working closely with the Mexican government, will help implement management of the species, especially in areas where tourists interact with whale sharks. Monitoring the population is critical to ensure that the whale shark population in the Gulf of California is not harmed by tourism.

In the Sea of Cortez, juvenile whale sharks feed in different areas. The preliminary results with photo ID show that some whale sharks move from one feeding area to another. Throughout the season, plankton blooms occur in widespread areas. Using telemetry tags on juveniles at the end of the season in



the different areas will help to determine whether the whale sharks migrate between these areas of food abundance. Because these feeding areas also support dolphins, fish, manta rays and other shark species, the presence of whale sharks is a good indicator of biodiversity – and that a region that requires special protection and conservation. Whale shark tourism has grown up in these locations, making it more economical to exploit whale sharks for tourism, rather than for consumption.

Project leader, Dení Ramírez, has been studying the whale sharks in the Sea of Cortez since 2002. Obtaining DNA samples, taking photographic IDs and observing whale sharks to obtain sex ratios and sizes has allowed her to define the population in this area. Using photos she has already identified over 80 individual whale sharks; this data will help to determine the whale shark population size from the Gulf of California.

A study begun in 2005 with the Centro de Investigaciones Biologicas del Noroeste has already shown that two whale shark populations, those in the Caribbean and Gulf of California, are genetically different. SOSF funding will support further genetic studies on a global level. Dení has already begun to examine whale shark genetic material from Mexico (Pacific and Atlantic Coast), Philippines and Mozambique (from Simon Pierce, see page 28 of this review). Plans to add whale shark information from populations in Australia, Dijibuti, Galapagos, Taiwan and elsewhere are proposed in order to establish migration patterns and populations. This information has important implications for the global conservation of whale sharks.

**Deni Ramirez, project leader in the Sea of Cortez**

## Mozambique

The coastal waters off southern Mozambique are home to one of the largest year-round populations of whale sharks found anywhere in the world. Whale sharks aggregate throughout the year within a narrow corridor adjacent to a small village at Tofo Beach to feed on plankton blooms. This has made the area a popular destination for international tourists wanting to swim with the sharks and an excellent base for researching the biology, ecology and conservation requirements of this threatened species.

Work since 2005 by project leader Simon Pierce, in conjunction with manta ray researcher Andrea Marshall through the SOSF-funded Manta Ray & Whale Shark Research Centre (MRWSRC), has identified over 350 individual whale sharks in the area. The ongoing work examines the population ecology of whale sharks, their patterns of residency in the area and their migratory movements in the region, as well as the threats to this population from human-induced threats such as fishing and boat strikes. SOSF funded the purchase of a dedicated research vessel and closed-circuit rebreathers to support this work in 2006, which has allowed detailed studies on both whale sharks and manta rays in the region.

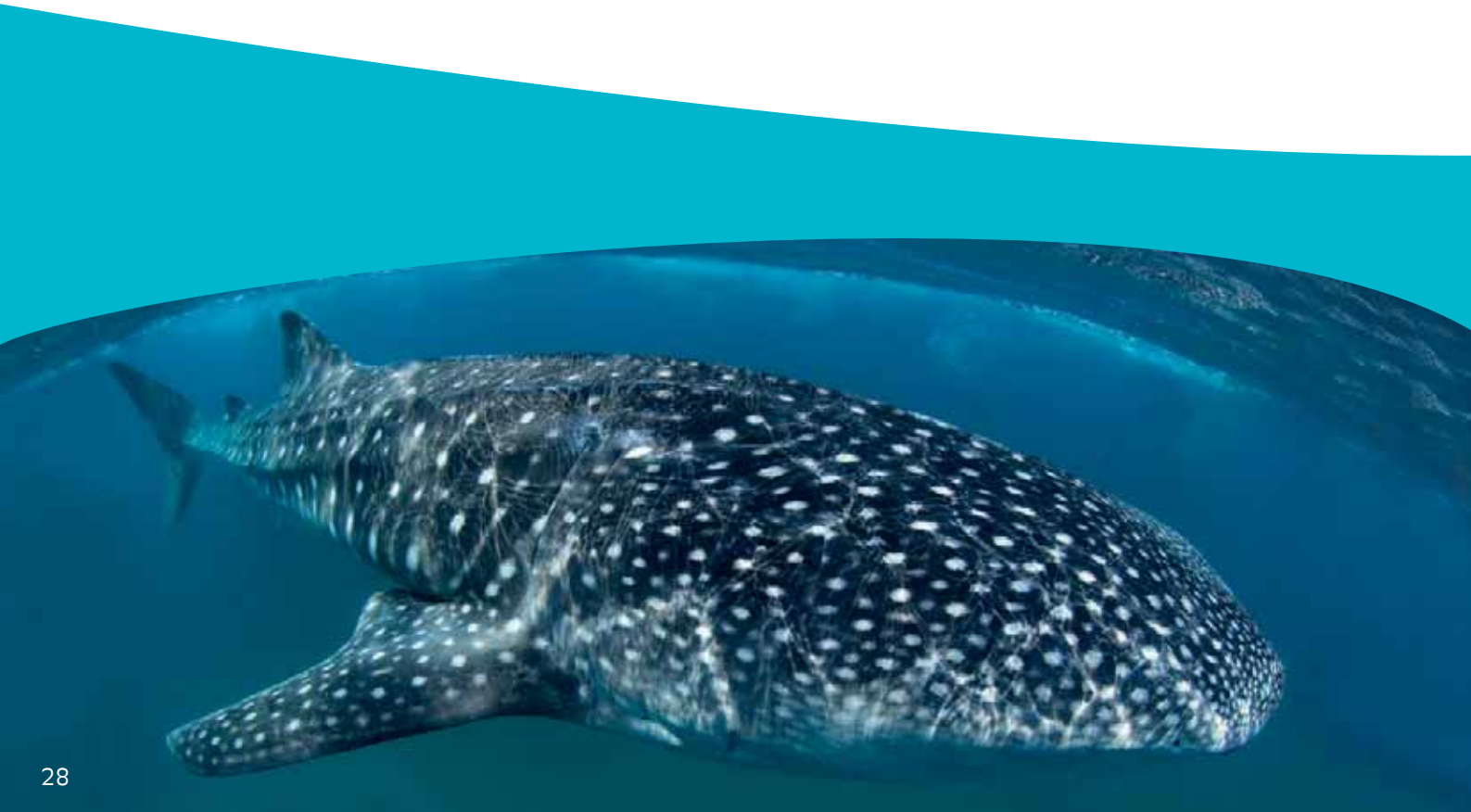
Current research includes the study of regional whale shark migrations in collaboration with other SOSF-funded projects in the region and the worldwide population genetics project led by Deni Ramirez. The MRWSRC's projects for 2008 include further studies of the oceanographic conditions in the area that create and support this critical habitat for plankton-feeding sharks and rays, the short- and long-term residency patterns of whale sharks in the region using passive acoustic arrays and the linkages between Indian Ocean whale shark aggregation sites using electronic and chemical techniques.

**Simon Pierce, project leader in Mozambique**

## Seychelles

The Marine Conservation Society Seychelles (MCSS) has been conducting monitoring and research into the occurrence of whale sharks around Seychelles since 1996. With sound scientific guidance and support from a number of organisations, including SOSF, the MCSS whale shark program has already revealed much information on the species to date, including the seasonal occurrence of sharks around Mahe and the areas most frequented. The research is led by David Rowat, a highly experienced diver and field worker, who is co-director of the Seychelles Underwater Centre, and chairman of the MCSS.

Marker tagging and photo identification studies from 2001 to 2006 have identified 468 individual sharks of which 55 were seen over a period of several years. Population estimates indicate a resident (site-faithful) population of 150 to 180 sharks that are joined annually by large numbers of transient sharks each year. Daily aerial surveys have shown that the occurrence of the sharks is limited both temporally and spatially, and that there are preferred hot-spots.



Data from pop-off satellite archival tags have shown that the species spends up to 60% of the time less than 10 meters from the surface but that they also make dives in excess of 1,000 meters. However, satellite-tracking studies have been fraught with problems since the sharks have shown an innate ability to remove the tethered tags. The data that was gathered showed that sharks migrate away from Seychelles in very divergent directions, even when tagged in the same feeding aggregations, just minutes apart. These migrations have recorded distances of travel in excess of 3,600 kilometers, passing through the territorial waters of many countries in the Indian Ocean.

As international concern for effective conservation and management of migratory shark species grows, it is increasingly important to have accurate information about migration routes of the species concerned. However, thus far, data on whale shark movements have proved difficult to obtain. The development of a robust satellite tagging methodology will have wide reaching implications throughout the research community. This project will be a cornerstone for an ocean-wide program that will in turn provide data on the movements of whale sharks throughout the Indian Ocean.

**David Rowat, project leader in the Seychelles**

WHALE SHARKS SPEND UP TO 60% OF THE TIME LESS THAN 10 METERS BELOW THE SURFACE BUT CAN DIVE TO DEPTHS IN EXCESS OF 1,000 METERS.

# DEEP SEA DIVER

**The SOSF-funded tiger shark (*Carcharias taurus*) research program on the Aliwal Shoal, South Africa has proved highly successful. All dives were characterized by large numbers of blacktip and dusky sharks that were attracted to the baiting stations but, more significantly, tiger sharks were encountered on every dive.**

A questionnaire was developed for the dive charter operators to complete during each tiger shark trip, providing invaluable information. Additionally, operators and their clients provided photographs of sharks seen during their dives, the primary source of data for the photo-identification catalogue during 2006 and 2007.

Most (>95%) tiger sharks encountered have been females and no pups were seen. Many of these were animals that had been seen during previous years. Individually coded telfon tags have been developed and deployed since November 2006. This technique of 'double tagging' (tagging and photography) should substantially improve the data collected in subsequent years to estimate philopatry and individual shark residency patterns.

18 VR2 listening stations were deployed in a grid within the Aliwal Shoal MPA for telemetry studies. Unfortunately, massive decadal storms off KwaZulu-Natal led to the loss of a substantial number of these and a consequent to loss of data for the project.

Four pop-up archival satellite tags have been successfully deployed. Two of these sharks have returned to the reef months after leaving. Results received from the data to date are already challenging what is known about the tiger shark: data collected shows that the sharks conduct frequent dives of over 300 meters and a record dive to 833 meters dive was recorded; swimming through changes of over 10 degrees centigrade suggest that this is not a 'warm water and tropical' species. Further findings over the next few years will provide vital knowledge about the ecology and behavior of the tiger shark.

**Vic Peddemors, project leader**

# BE WISE ON THE WATER

**The shallow shelf-sea waters around the British Isles are home to a wide variety of marine megafauna, including 24 species of whales and dolphins, a myriad of seabirds, the world's largest population of grey seals as well as the basking shark, the second largest fish in the world.**

Although many of these species are protected by law, they remain vulnerable to a number of threats. Some are direct, as in the case of fisheries that cause entanglement in nets, and can be regulated against in extreme cases through restrictions on the sale of by-caught animals, for example. Others are more subtle, however, and are related to the public desire to observe marine life in the wild, or are a by-product of the dramatic increase in leisure use of coastal waters.

WiSe (Wildlife Safe) is a training and accreditation scheme aimed at operators of passenger pleasure craft, wildlife cruise operators, dive boats and charter yachts who come into contact with this marine wildlife. WiSE has been running training courses since 2003 and, to date, has trained some 500 individuals in the techniques of successfully viewing marine life whilst minimising disturbance.

SOSF has provided WiSe with the funding to produce a specifically created DVD, targeting the boat-owning public, encompassing the latest conservation thinking and scientific knowledge with examples of disturbance and best practice across a variety of different species and situations. The DVD aims to raise awareness and reduce the levels of disturbance. It has been developed in consultation with the Royal Yachting Association (RYA), Natural England, Countryside Council for Wales and Scottish Natural Heritage.

Project leader Colin Speedie has spent the last four years lobbying boating organizations so was particularly pleased to have the draft version of the DVD shown at the Southampton Boat Show in summer 2007 as part of the RYA's Blue/Green initiative. The DVD is now in the final production stages with a voiceover by Ben Fogle (BBC presenter and WWF ambassador). It will be launched in 2008 and will be made available to water sports clubs throughout the UK.

**Colin Speedie, project leader**

# REVEALING NEW BEHAVIOR PATTERNS

**At up to 10-11 meters in length and 5-7 tonnes in weight, the basking shark (*Cetorhinus maximus*) is both the second largest shark in the world, and the second largest fish. Globally, as a result of fishing pressure, its existence is seriously threatened, and, as a consequence, it has now been given protection in European waters. It is seen regularly between mid and late summer along the west coast of Scotland, where it feeds on zooplankton near the surface of the ocean.**

A major problem in the basking shark's conservation and management is that no reliable estimates of its numbers have been made. This is largely because it was assumed that the numbers seen at the sea surface represented the total population number presented. It is now appreciated that the sharks also feed at depth and the numbers seen at the surface represent only a variable portion of the total, depending on the amounts of zooplankton present.

Since 2004, Dr Mauvis Gore has been leading an SOSF-funded research project to quantify and qualify the population dynamics and demographics of the basking shark in Scotland. The project is being carried out in collaboration with the University of London Marine Biological Station Millport (UMBSM), in the Firth of Clyde in south-west Scotland, and in association with other environmental groups and agencies, notably the UK Marine Conservation Society.

As part of a program to raise awareness about the project and the work of SOSF, and to establish a network of volunteers to report sightings of the sharks, a large number of leaflets, newsletters, stickers and logging sheets have been distributed, and talks given to interested groups. In 2006, this achieved a 27% increase in the number of volunteer observers.

In 2006, plans for research were partly restricted by problems with the lack of tag availability, by atrocious weather conditions during the time spent in the field and by the unpredictable timing of sightings.

In 2007, with background work on the relationship between the basking sharks and their zooplankton food sources completed and an effective observer network in place, priority could be given to quantitative surveys, photo-identification and monitoring the movements of individuals through tagging.

In all, the 2007 season was highly successful, a consequence in part of the acquisition of a new project vessel, *Fairy Tern*, a 'fast-fisher' that is small enough to maneuver around sharks and be used for tagging, yet big enough to provide basic overnight accommodation, and survive moderately rough weather. The boat has already proved invaluable, enabling the team to get out at short notice, responding to reports of sharks as they occur.


SUCCESSFUL SATELLITE TAGGING HAS PROVIDED INTERESTING RESULTS AND REVEALED A NEW BEHAVIOR PATTERN FOR BASKING SHARKS.

The team has also been able to take volunteers out to sea with them, and reach more of the public to raise awareness of shark conservation issues. Perhaps as a result, more basking sharks have been recorded than in previous years, with the number of sightings in Scotland this year reaching 366 between early April to early October. The largest number of sharks seen on one day was 52, recorded by the Project Basking Shark team along the east coast of the island of Coll, in the Inner Hebrides.

So far as possible, all the basking sharks encountered have been photographed, with close-up pictures of dorsal fin and, where possible caudal fin, being taken for photo-identification purposes. Besides increasing the catalogue of identifiable individuals, this has begun to provide data on the proportions of re-sightings.

While a handful of the sharks identified were ones that had been recorded in the same or near-by locations within a period of weeks, the number of new sharks was considerable. Further analysis will provide information to relate the numbers of sharks recorded by the observer network to the numbers of sharks observed feeding in surface waters.

Most excitingly, four satellite archival tags have been deployed, using an improved attachment method, and have been generating data. The tags provide information on the depth and temperature profiles of the sharks, as well as their locations throughout the time the tag is attached. Two of the tags were deployed off the Isle of Man in collaboration with DAFF (Isle of Man Department of Agriculture, Fisheries & Forestry) and the Manx Wildlife Trust and Marine Conservation Society-sponsored Basking Shark Watch.

The first two tags have provided particularly interesting results. One shark had moved north from the Isle of Man into the Clyde Sea Area, much as expected, rather than continuing further north to the Hebrides. The other, however, had gone in the opposite direction, moving into deep water, and crossing the Atlantic Ocean, showing a new behavior pattern for basking sharks. The two remaining tags were deployed off the Isle of Coll, on the Scottish west coast, and should down-load their data by late November 2007. This will provide further insighful data into the behavior and dispersion of this key population of basking shark.

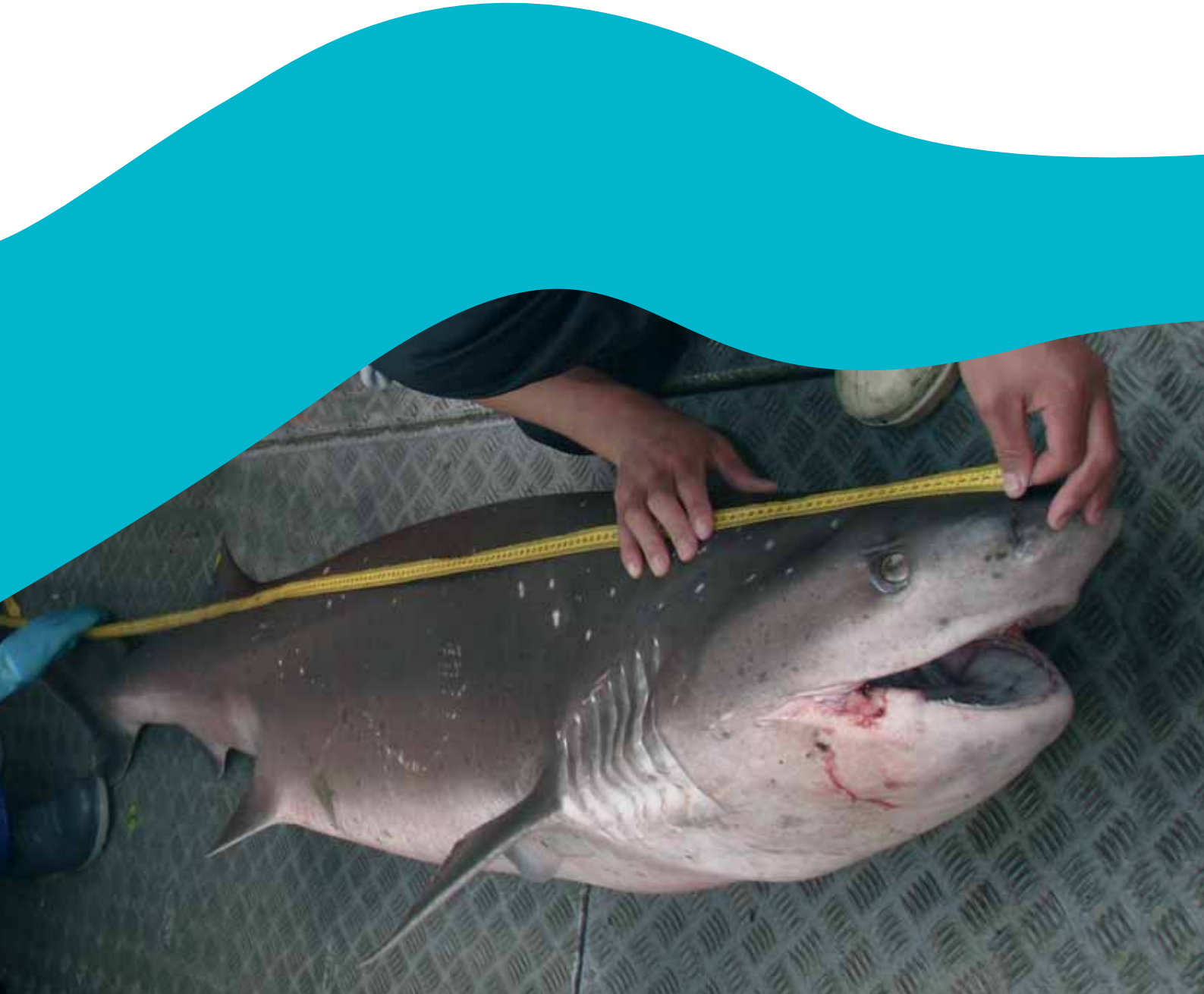
**Dr Mauvis Gore, project leader**

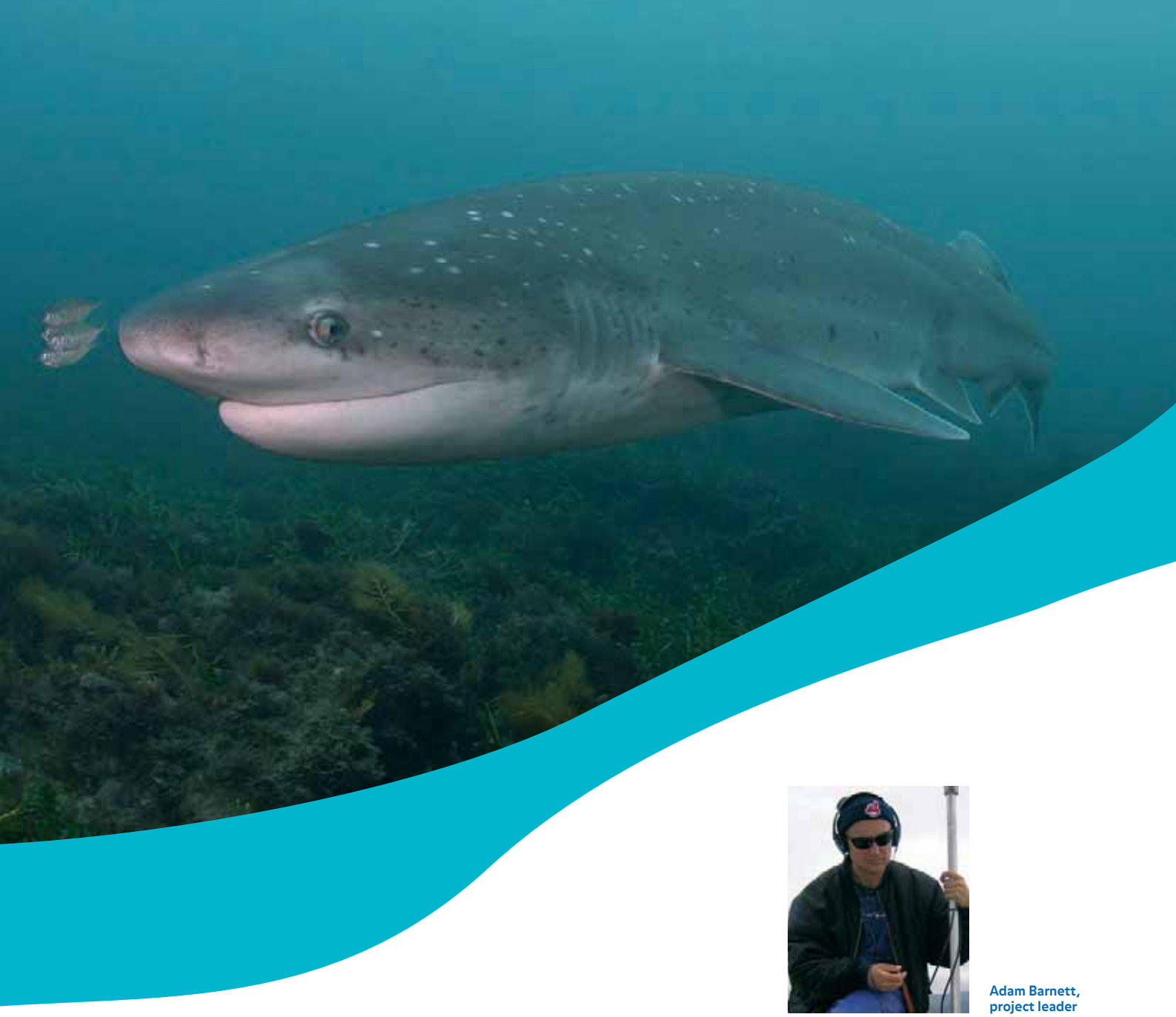
# INSHORE SHARK MANAGEMENT

**Shark populations worldwide are being placed under escalating pressure through both targeted fisheries and as bycatch from other fisheries, with many shark species being depleted at an alarming rate. Few countries have implemented management strategies of shark fisheries or conservation plans to protect dwindling shark populations. Australia does maintain and manage fisheries for some target species – e.g. school (*Galeorhinus galeus*) and gummy (*Mustelus antarcticus*) sharks. For the majority of non-targeted species there is a distinct lack of biological, ecological or catch data.**

The sevengill shark (*Notorynchus cepedianus*) is an excellent example of one such species. A large coastal species, common in most temperate seas of the world, very little is known about many aspects of the sevengill shark's biology and ecology or how many are caught annually in Australia. They are probably the most significant top-order predator in the bays and estuaries of southern Tasmania where they are believed to be both specialist elasmobranch (shark, ray) predators, and significant predators of seal pups around seal colonies. They are the dominant bycatch species in southern commonwealth shark fisheries and are becoming increasingly important as a target species. However, research on the species has been scant.

Using the sevengill shark as a case study and with financial support from SOSF, Adam Barnett is now undertaking a PhD that explores the role of higher trophic level predator on inshore ecosystems and their interactions with fisheries. This is a collaboration between the University of Tasmania through Tasmania Aquaculture and Fisheries Institute (TAFI) and CSIRO Marine & Atmospheric Research, Tasmania. Overall, this study has three main aims: To increase the knowledge of a species that is poorly understood;







**Adam Barnett, project leader**

to expand our knowledge of the interactions of apex predators with their ecosystem; and to address fisheries management issues such as fishing pressure applied to sevengill sharks. Additionally, the study will examine the degree to which sevengills feed on early year classes of commercially-fished shark species within areas that have been set aside as shark refuges. It is hoped that this will provide a broader understanding of ecosystem issues in the management of large predators that interact with commercial fisheries.

Good progress has been made during 2007, with almost 200 sharks being tagged with conventional fishery tags and released. Two sharks have also been actively (acoustically) tracked, which showed that these sharks are capable of moving relatively large distances (more than 30 kilometers) over short periods of time. The tagging data thus far has produced some interesting preliminary results with one particular habitat being identified as a potential hot spot for this species. Over the next year this will be validated and hopefully show why this particular habitat is so heavily used.

These preliminary results have assisted in the planning of the next phase of the project. Funding from SOSF has facilitated the acoustic tracking component of the study that will be implemented towards the end of 2007 and early 2008. Fifty-five VR2 receivers will be deployed with tagging planned for 60 sharks, including both sevengill sharks and significant prey species such as gummy and school sharks. Coded transmitters will be used to investigate movement patterns, seasonality, site fidelity and hopefully gain information on predator prey interactions. The receivers will be deployed for the next 15 months to allow monitoring of the sharks over all seasons and, during the peak season of tagging, a VRAP system will also be used to investigate fine scale movements of both predator and prey. In addition ten sevengill sharks will be tagged with archival tags to investigate larger scale movements and a further three sharks will be actively tracked to enhance fine scale movement data.

# PIONEERING NEW TECHNIQUES

**The blue whale (*Balaenoptera musculus*) is the largest animal on earth and yet is one of its least known and most endangered species. Still recovering from the effects of whaling, there has been some evidence of increasing numbers in Northeastern Pacific but planned developments in the Gulf of California could present a major setback for the blue whale population.**

Part of this population summers off the coast of California and migrates south in winter, along the coast of Baja California, Mexico. Less than half, around 500 whales, spend the winter in the Gulf of California. Female blue whales nurse their young, while feeding themselves on euphausids (krill) that form dense aggregations here. With their habitat now under threat, it is vital to build a clearer picture of the population structure.

Dr Diane Gendron of the Marine Mammal Ecology Interdisciplinary Marine Science Center (CICIMAR) has been instrumental in establishing a unique database of 460 blue whale sighting histories, based on photo-identification and tissue sampling since 1993 at CICIMAR. The blubber and skin are then used to look for biotracers that could help to discriminate the whales into group/age categories. However, no information exists on the size or age structure of the population, since until now there has been no method of measuring whales at sea.

A pioneering method has been designed by a student in the CICIMAR doctoral program (Christian Ortega Ortiz, in process) which consists of taking photographic sequences of the whale's flank, now easily accomplished using digital cameras, while simultaneously measuring the distance between the whale and the camera using a laser range finder. The estimated total lengths for the blue whales obtained with the photo-sequences method, were compared with an independent method: aerial photogrammetry. Preliminary results suggest that the new measuring technique provides accurate size measurements. So far, we have measured 60 different blue whales, in average of 22.3 meters, with a minimum and maximum of 7.9 meters ( a calf) and 29.9 meters.

Comparisons of the total length between sexes and locations will be done in order to describe the population structure. Likewise the measured whale will then be compare with age group categories estimated from the life history data base of the individuals. SOSF funding of additional field work and analysis will determine and validate the precision of this method.

**Dr Diane Gendron, project leader**

# SUPERSTAR SUPPORTS ANTI-FINNING CAMPAIGN

**In 2006 SOSF's successful television special, a co-production with Wild Aid, reached an estimated audience of 200 million Chinese viewers. China remains the largest consumers of shark-fin products; the film set out to reveal the beauty of the marine world and the vital need for conservation to halt the extinction of many species.**

In support of this campaign, China's most popular celebrity and National Basketball Association superstar, Yao Ming, has recently pledged to no longer eat shark-fin soup. WildAid, with the help of SOSF, has secured prime locations in the capital Beijing to ensure maximum exposure for a series of giant billboards featuring Yao with sharks and the clear message: 'When the buying stops the killing can too'. These 20 billboards will be seen by 1.1 million commuters every day.

A second documentary featuring top musician, Liu Huan, will be broadcast on television in 2008 and additionally will be shown repeatedly (60 times a day) on 2,600 video billboards in Beijing reaching an audience of about 33 million a year.

In January 2008, Wild Aid will also be launching the results of a survey on shark-fin consumption. Key among the findings, that 76.3% of Chinese people do not know what shark-fin soup is made from which highlights the extent of the problem and the importance of the need to raise awareness.

## 76.3% OF CHINESE PEOPLE DO NOT KNOW WHAT SHARK-FIN SOUP IS MADE FROM

# THE DUGONGS OF ABU DHABI

Cinematographer
Tom Campbell

**Hundreds of dugongs (*Dugong dugon*) congregate each year in the warm coastal waters of the Arabian Gulf, off the coast of the United Arab Emirates to graze on the vast acres of sea grass that grow there, earning them the common name of 'sea cows'. The dugong, which can grow up to four meters in length and weigh up to 400 kilos, requires a daily intake of up to 30 kilos of sea grass.**

Dugongs are the only herbivorous marine mammal and the preservation of this habitat is vital to their survival.

UAE has established conservation, education and public awareness programs to help protect the dugong population and the sea grass beds. The film, *The Dugongs of Abu Dhabi*, showcases this story. Sponsored by SOSF, it was shot and directed by renowned cinematographer Tom Campbell with narration by actor Michael York and won gold in a number of categories in the 2006 Millennium Awards in the US.

# THE KEY TO WATER QUALITY?

Dr Wera Leujak

**Recent research has highlighted the potential use of cultured bivalves, notably mussels, not only as food and as bio-indicators of water quality, but as biofilters for improving water quality in the region of nutrient and detritus effluent, and as components within polyculture systems. There is currently significant interest in exploring practical options for use, both in temperate waters and in tropical coral reef dominated environments. As a result there are several collaborative research projects underway, in Europe and North America, including one linked to pilot studies undertaken at Eilat, in the northern Red Sea.**

In broadening its research portfolio to embrace aquaculture, water quality and bioremediation aspects of the marine environment, SOSF is exploring possible research and development options. Dr Wera Leujak, a specialist in marine invertebrate ecology, is undertaking a detailed assessment that covers both published work and, so far as practicable, ongoing research and existing aquaculture practices. This should lead to recommendations either for or against further involvement and, if the former, in identifying one or more research opportunities to be taken forward.

# FRAMED AT THE LONDON AQUARIUM

**Throughout the past year, SOSF has successfully built a strong working relationship with the UK's flagship aquarium in the heart of London. The London Aquarium has been receptive to the objectives of SOSF, not just in this country, but the world over.**

SOSF was included in three mail outs to a total of 30,000 educational bodies, including pre-school, nursery, primary, secondary university and special needs. To date, the Aquarium has distributed SOSF leaflets and calendars. SOSF now has a permanent presence on the new London Aquarium website, with an additional link to the SOSF website.

SOSF educational and promotional merchandising has been distributed via the London Aquarium.

SOSF is also pleased to be the sole sponsor of a permanent exhibition of underwater images by deputy curator and keen photographer, Jamie Oliver. Displayed in the entrance foyer to the Aquarium, the SOSF-branded images will be viewed by over one million visitors a year.

" WE MUST EDUCATE THE CHILDREN OF THE WORLD TO EMBRACE AND FOSTER A HUMAN STEWARDSHIP FOR OUR WATER WORLD. THE WELL BEING OF OUR FUTURE FOR GENERATIONS TO COME LIES IN THEIR HANDS."

THE FOUNDER

## GUARDIANS OF THE FUTURE

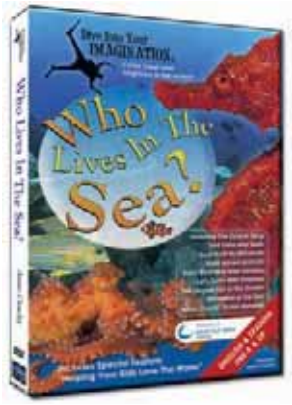
**The need to protect and preserve the marine environment is at the core of the investment that SOSF is making into projects worldwide. But the commitment to the future goes much deeper than that: raising awareness among adults about pollution and overfishing is important; instilling the right attitude towards the use and abuse of the planet's natural resources from an earlier age will have an even more profound affect in the longer-term.**

This is why SOSF is so passionate about the development and expansion of an ambitious educational program aimed directly at children and teachers who equally have an important role to play in educating and influencing their pupils.

Elsewhere in this review, we have already reported on the fantastic work that the SOSF M-Sea Program is undertaking with children in South Africa: in addition to distributing curriculum-linked books and posters, M-Sea is also working with the Two Oceans Aquarium to supply outreach teachers at remote coastal schools and on board the innovative Edutrain, a classroom with wheels that runs along the False Bay coastline.

A number of films and videos aimed at children have also been produced, with more in the pipeline: Annie Crawley's *Dive into your imagination* an interactive DVD uses actual underwater footage to tell children about the colourful creatures of our oceans; filmmakers SisBro produced a video that brings the magic of the underwater world to children of the landlocked mid-west region of the US; Jacquie Cozens' award-winning *Grey seals – Life on the edge* is being adapted for viewing by a younger audience; *Giants of the deep*, about the plight of the whale shark, is written, filmed and narrated by teenage filmmaker, Michael Wham, who believes that he is in a unique position to reach other teens and children.

The internet plays a huge part in the lives of the younger generation and, in addition to its main website, SOSF has developed two further websites for younger children (www.sosforkids.com) and teenagers (www.sosforteens.com); both have individual styles enabling them to connect directly with their audiences. A great deal of research went into ensuring that the user experience and content are right for each age group. The sites are entertaining, funny and colorful, and make good use of multimedia and animated affects.


In addition to facts about the ocean and marine life, sosforkids includes party tips, games, stories, pictures for colouring and much more – all with an underwater theme. For teenagers, the dedicated sosforteens site, offers more detailed interactive information, puzzles, cool links and pictures, videos, a specially commissioned comic strip and other online activities to raise their awareness about the marine environment. The underlying context of both sites reinforces awareness, protection, preservation and conservation of the global marine environment in line with SOSF's mission statement. Alongside these, SOSF has set up an invaluable teachers' website that provides online resources and lesson plans to help teach young children about environment conservation: www.sosesr.com.

SOSF has also produced a wide range of printed material, aimed at a number of different age groups. The story books, DVDs and puzzle books are high quality, colorful and entertaining as well as educational (edutainment). Books are distributed through schools, colleges and a growing SOSF distribution network During 2006/07, a number of new titles have been added to the growing catalogue and more are under production.

### Ocean Life: From A-Z

An innovative book and DVD pack that lets children discover the fascinating underwater world – without even getting wet. Through each letter of the alphabet, they learn fun facts and interesting information – all supported by amazing photographs and a DVD showcasing incredible footage of the featured marine creatures.

### SeaSmart Kidz Marine Activity Book

This colorful book uses puzzles and friendly characters to help educate children about marine conservation issues. Produced in both Arabic and English, young children are the characters teaching other kids about conservation awareness.

### All the way to the ocean

This illustrated storybook tells children how rubbish and pollution on our streets and backyards eventually finds its way to the sea, causing harm to marine animals. Originally produced in English, this has now been translated into Spanish and Chinese in order to broaden the reach of the conservation message in areas where marine pollution is particularly bad.

### Simple ways to save the planet

This booklet educates children to think about how every day actions as simple as switching off lights and recycling cans have a positive impact on the environment. Available in English, Arabic, French, Italian, Spanish and Chinese, copies have been made available to schools to help spread the message and get children involved.

### Fishes of the Red Sea

This colorful and informative poster has been produced in Arabic and English and distributed to schools around the Red Sea border countries.

## Spreading the word

Raising awareness about the work of SOSF among adults is obviously also important. A number of new initiatives have been undertaken during the last year, producing material to help inform and educate both policy makers and the general public about the need to protect and conserve the environment.

### SOSF 16-month calendar 2007-2008

This stunning calendar features high quality marine photos of Nudibranchs (seaslugs) along with interesting facts about their life and habitat. It has been distributed worldwide through project leaders and committee members. The 2008-2009 calendar, Watercolours, has recently been published and will have a much wider circulation, being produced in two formats: wall and desk-mounted.

### Eco-friendly tips to save the planet

This adult version of *Simple ways to save the planet* provides the general public with numerous ways in which they can help reduce the damage to the planet through everyday activities. In Arabic, English, Spanish, Chinese, French and Italian with a downloadable e-books available on the SOSF website at www.sosebooks.com.

### Rethinking the Shark

In South Africa, a series of three posters dispels some of the myths about sharks and counters the hysterical press reporting about shark incidents. The posters use statistics comparing the number of people killed by sharks with those killed through domestic accidents: 791 through defective toasters; 358 by falling kites; 652 involved with chairs – only four people killed by sharks.

### Coral Reef Guide to the Red Sea

Produced in conjunction with book publishers, Collins, this is a definitive guide to the underwater life of the reef for divers, snorkellers and aquarists. It contains references to some 1,200 species with over 300 photographs and illustrations as well as maps of good dive sites.

### The end of the line?

SOSF are the co-sponsors of *The end of the line?* This brochure depicts in detail the global threats to shark. Produced by WildAid it provides an informed overview of the plight of sharks in our world's oceans.

## High Definition and beyond

The Founder's decision to invest in High Definition (HD) technology, as long ago as 1998, has provided SOSF with a resulting unique library of over 500 hours of HD footage. An ambitious program to film all SOSF-funded projects worldwide, under the leadership of cinematographer Tom Campbell, continues to add more exciting and groundbreaking footage to this record of marine research – in 2006 filming took place in Mozambique, Mexico, Seychelles, Indonesia, Scotland, Hawaii, Abu Dhabi and Egypt. The SOSF HD library is now available to a wider public through the BBC, Ocean Channel and National Geographic.

During the last year, a number of SOSF-funded films were released and these include:

- *The Dugongs of Abu Dhabi* (Tom Campbell) – which won gold at the US 2006 Millennium Awards
- *Whales Sharks of Holbox* (Michael Wham) – winner at the US Kids First! Film and Video Festival
- *Maxine's Journey* (Lesley Rochat) – the story of a captive ragged tooth shark's return to the wild was broadcast across South Africa
- Chinese TV documentary (WildAid) – highlighting the plight of sharks and the need for conservation was aired on Chinese television to an estimated audience of two million viewers.

SOSF provided sponsorship for a number of prestigious wildlife film festivals, including: the International Wildlife Film Festival in Missoula, Montana; the Jackson Hole Wildlife Film Festival in Grand Teton National Park, Wyoming; and WIldscreen In Bristol, England. These festivals are attended by thousands of delegates from around the world who are the key players in the wildlife and nature production world.

SOSF has acquired the use of Tom Campbell's stills library, with some 50,000 high quality images depicting the vast array of marine life, accumulated over the last 30 years. These images being scanned into digital formats to increase accessibility for SOSF conservation awareness, publications and sales.

www.saveourseas.com – the SOSF main website – contains a wealth of information about the marine world and global research projects funded by SOSF. It also provides access to a wide range of previously published material in pdf and e-book formats. During 2007, a series of short documentary podcasts (adapted from footage within the HD library) have been added to the site and can also be viewed both on *YouTube* and by visiting sospodcast.com. Another exciting development has been SOSF's first venture into virtual worlds with the establishment of SOSF Island in Second Life. Visitors to the website site (already over 2,000 each day) can be teleported to the Island to learn more about SOSF by visiting the virtual office, aquariums, project building, auditoriums and University complex.

## Making the difference

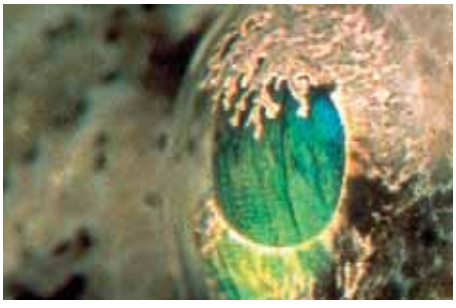
SOSF's projects place the organization at the forefront of marine scientific research. The global collaboration that is taking place between project leaders is providing an unprecedented depth and breadth of knowledge about key marine species. This will in turn make a positive contribution to the development of better management plans for the long-term protection of these particular species and the wider marine environment.

SOSF's willingness to embrace new technologies in support of its global program of projects has actively enabled better scientific research, increasing the quality of the results and promotes SOSF and its work to the widest possible audience. Through both traditional and innovative channels of communication, SOSF is broadcasting its mission throughout the world to help make differences that will help protect the planet for future generations.

**For more information about the Save Our Seas Foundation, its mission and the global conservation projects, please visit www.saveourseas.com.**


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

THE FOUNDER, SOSF



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