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BIG SHARK SPECIAL

GREAT whites

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5 KEY skills

to hone in the pool

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'MY LIFE WITH SEALS'



SUB WAY TO VOBSTER



MEGA-BRIGHT GREEN FO...
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...ossible?) -
...y for everyone.

TROY DIVE

He's Jacques Cousteau's grandson, he started diving at four and he has just spent 100 hours driving a temperamental robo-shark submarine in search of great whites. Fabien Cousteau tells **Nick Steer** how it went – and where he goes from here



"THERE'S SOMETHING ABOUT SWIMMING ON THE BOTTOM with a rebreather, trying to find the shore in the pitch dark, during the best time of night for sharks to feed and right near an elephant-seal rookery, that is not very comforting," says Fabien Cousteau, with impressive understatement.

He is telling me about the time his one-man shark-shaped submarine lost contact with its support boat off Guadalupe, Baja California, and how he decided to anchor it to the seabed and swim to shore – as you do.

"There were many times that I got buzzed by an elephant seal that definitely jolted me, so the adrenaline was running. That was probably the longest 'short' swim I've ever had in my life," he says.

Fabien is the grandson of world-famous oceanographer, TV icon and co-inventor of the aqualung Jacques-Yves Cousteau, and son of environmentalist diver Jean-Michel Cousteau, founder of the Ocean Futures Society.

Like his illustrious forebears, he works towards marine conservation and understanding. Now he has fulfilled a childhood dream by building a sub to take among great whites, his aim being to discover more about their lifestyle.

When my editor asked me if I would like to do an interview, I was expecting something easy to give me some experience, bearing in mind that the only interviews I had done to date involved being asked why I was suitable for a job.

Then he said: "You'll be interviewing Fabien Cousteau." Cousteau – the one name synonymous with the underwater world, recognised all over the world by divers and non-divers alike. Talk about being thrown in at the deep end.

Plenty of research later, I'm standing outside the Doering Kindersley offices on London's Strand checking my watch every 30 seconds, trying to be neither late nor early.

At exactly 2pm I push through the huge revolving glass doors and get checked over by security.

Why DK? Fabien had recently put his name to its massive new *Oceans* encyclopaedia. In reception I see the man himself. He has arrived from the States via

Paris minutes before, and probably walked past while I was busy with my watch. A PR woman whisks us off to an empty conference room, and from the small talk it's obvious that Cousteau is going to be easy to get along with.

He talks animatedly, though seems hard-pressed when asked for memories of his legendary grandfather. The "injection of knowledge and passion" for the oceans from his parents and grandparents was merely a matter of growing up naturally with new discoveries and wonders, like any child, he says.

But he does remember buddy-breathing with a family friend at the bottom of a swimming pool at the age of four. "I have the honour of saying I'm the one who started diving the youngest in our family?" he says.

He also recalls his father Jean-Michel lecturing aboard a cruise ship when he was about eight. "There's an ocean film showing in the theatre, can I go see it?" he asked his parents.

Learning that the film was *Jaws*, they said no. He sneaked in anyway.

"I wasn't scared by the movie, but I was very puzzled by it, as it went against everything I had learned up until then," says Fabien.

FROM BOARDING SCHOOL in the USA, Fabien went to the University of Boston to study environmental economics – "viable modern-day solutions to environmental problems". He laments what he sees as the lack of business sense in non-governmental organisations, however altruistic their intentions.

He worked in an art gallery as a graphic designer, then in marketing for eco-friendly product manufacturer Seventh Generation. He says this business experience helped him to overcome shyness and talk to executives on a level they would understand.

Fabien's passion for sharks and his business-driven environmental approach led to his first independent film production, *Attacks of the Mystery Shark*.

The hour-long show aired on National Geographic in 2002, exploring a series of fatal attacks off New Jersey in 1916 that were blamed on a great white.

He now works with two production companies. Natural Entertainment deals



in TV series, small productions and eventually, he hopes, big-screen docs and IMAX films, while Deep Blue Productions was created for his ambitious Troy project for CBS, the *Mind Of A Demon* programme already aired in the USA.

Troy is a 4.2m shark submarine in which a single rebreather diver can lie at the controls. It was built for Fabien by engineering and animatronics expert Eddie Paul and his team.

Eddie had already built a primitive robo-shark for Jean-Michel Cousteau in 1989. This Hollywood backroom star was the creator of such memorable on-screen vehicles as the General Lee for the original *Dukes of Hazzard* TV show, and the cars from the films *Grave* and *The Fast And The Furious*. He even built robotic horses for *The Mask of Zorro*, and fully functioning promotional cars for the recent Pixar film *Cars*.

AS A CHILD, FABIEN HAD READ the children's adventure book *Red Rackham's Treasure*, and its cover picture of Hergé's hero Tin Tin driving a shark submarine stuck in his mind. His father's unsuccessful concept must also have influenced him, and Fabien says he was never certain that Troy would work.

Built to mimic a shark in every way, Troy's skeleton of 5cm-thick stainless-steel ribs is covered with Skin Flex. ET was perhaps the most famous wearer of this elastic material, used by Hollywood as prosthetic skin. Mixed with polymers to give the exact look and texture of a great white, it was considered crucial if Troy was to be accepted by real sharks.

The sub has three cameras: two behind the shark eyes, one in the rear. It moves like a real shark, too, using a closed-circuit pneumatic system that pushes air through a 120cu ft cylinder and, crucially, produces no engine noise or bubbles.

High-pressure air is pumped through a control stick to guide the sub left, right or forward. This in turn fuels two pistons that move the shark's tail back and forth in a fluid, realistic motion.

Fabien Cousteau contends that problems with Troy (or Sushi, as Eddie Paul's team dubbed the robo-shark) were inevitable. "No fault of Eddie's or anybody else, but the short research and development timeline and the season to be on site made it so that we took the under-tested prototype into real circumstances."

'Buoyancy was a problem from the very start and never got sorted properly'

Buoyancy was "a problem from the very start and never got sorted properly," he says.

"The sub had never been tested other than in a freshwater pool, nor was it perfect then. There were many times it crashed to the bottom or sky-rocketed to the surface with no warning with me in it, as I was the only one to pilot it for over a hundred hours. It's part of the adventure and of testing the unknown.



"The only way out if something did go wrong was the way you got in," says Fabien. "The head is a hatch you have to push open from the inside and, of course, the further down you go, the higher the pressure gets."

Also apparently problematic were communications with the support boat. Fabien says the system adopted was not designed for underwater use and worked only about two-fifths of the time. "Most of the time they didn't know where I was and I didn't know where they were." Hence that dodgy swim to shore.

Eddie Paul gave his version when I contacted him later. "The shark is an incredible piece of engineering that was tested several times with absolute success in the presence of Fabien and his production crew," he told me. "They were extremely happy with Sushi, to the point that they were eager to take the sub into deep waters for its intended use.

"Yet due to the fact that no actual shark drama came about over months

Clockwise from top left: Troy the robo-shark is lowered from the mother ship; Fabien with father Jean-Michel and sister Celine Cousteau; skeletal Troy during the build by Eddie Paul; checking the rebreather before the shark's head is swung into place. Far left: Fabien Cousteau.



Top: Three Cousteaus in action – Céline, Fabien and Jean-Michel.

Above: Fabien exits the shark sub.

Below right: Troy certainly looks the part.

and months of filming, the storyline shifted to create drama with Fabien trapped in a malfunctioning shark/sub."

Clearly Troy had caused tension between builder and TV crew. How had the great whites reacted to the robot shark? "Any reaction was a good reaction," says Fabien, laughing. So what had he learnt about the sharks?

Not that much yet, seems to be the answer. "I never expected any specific results, just that we needed to go beyond the box and see if something of this sort could be viable.

"There were two levels to the experiment – first the technological aspect and feasibility, and second reducing the intrusive nature of our presence under water.

"Even if we had just succeeded in the daunting task of making a functioning swimming shark submarine observational platform, I would have deemed our expedition a success.

"As you can imagine, the road was not easy to make this unique, first-of-its-kind prototype function properly in a real-world environment – but every success is 99% failure. After spending countless hours piloting it, we can say that it can be a viable platform for observation in a less intrusive way.

"What's more, it seems that some of the sharks we observed tended to react to Troy as they might do to another of their kind. One would need countless years on site to prove such a thing, but I got the feeling that they were more relaxed and going about their usual business, rather than being skittish or reacting to stimuli.

"Sneaking in the back door of the shark world offers the opportunity to see them in a way not possible before. Given the circumstances, natural territorial behaviour, passive hunting, copulation and so on are just a few observational aspects that such stealth can afford."

I ASKED FABIEN WHAT HE THOUGHT

about observing sharks from cages. "It brings awareness to people who can afford to do it or want to do it," he says. "The only thing I don't like is that we're conditioning these animals to being used to people in cages coming in close and being fed."

"I think it also conditions people the wrong way, because they're seeing these animals from behind the bars, and I think that's something that in our deep psyche is detrimental."

It frustrates him that sharks, great whites in particular, have been given their bad reputation by people who don't appreciate that all marine animals are wild and potentially dangerous.

"Dolphins are no exception," he says. "People see them as cute and cuddly, but they can be very dangerous.

"Sharks play an important role as the cleaners of the ocean, eating the sick and dead, but that's easily forgotten when we're looking for something to identify with, even though they do exhibit certain traits such as personality, intelligence and cognition."

He doesn't believe the image of sharks can ever match that of whales and dolphins, but hopes, in time, for a healthy respect – and, ultimately, a kind of reverence.

So what else is Fabien doing to educate the public? He has been heavily involved in renovating Governor's Island in New York, with an Oceans Educational Institute built under his guidance that he hopes will impassion current and future generations.

He is spearheading another such institute in collaboration with the University of South Carolina, and hopes for the next to be somewhere in Europe.

He carries a National Marine Fish Card to make sure he doesn't eat anything non-sustainable, and makes a point of giving one to head chefs who, he says, are usually very thankful. "It's an easier way to influence the world."

With DK he is working on a series of books for children aged 4-8, hoping to catch them at their most impressionable, and the PBS network will be showing his *Underwater Treasures*, two one-hour shows looking at US marine sanctuaries.

He is also working with his father and sister Céline on various typically Cousteau projects. They have been to the Amazon to see what has happened since Jacques was there 20 years ago, before heading to the Arctic and the Mississippi.

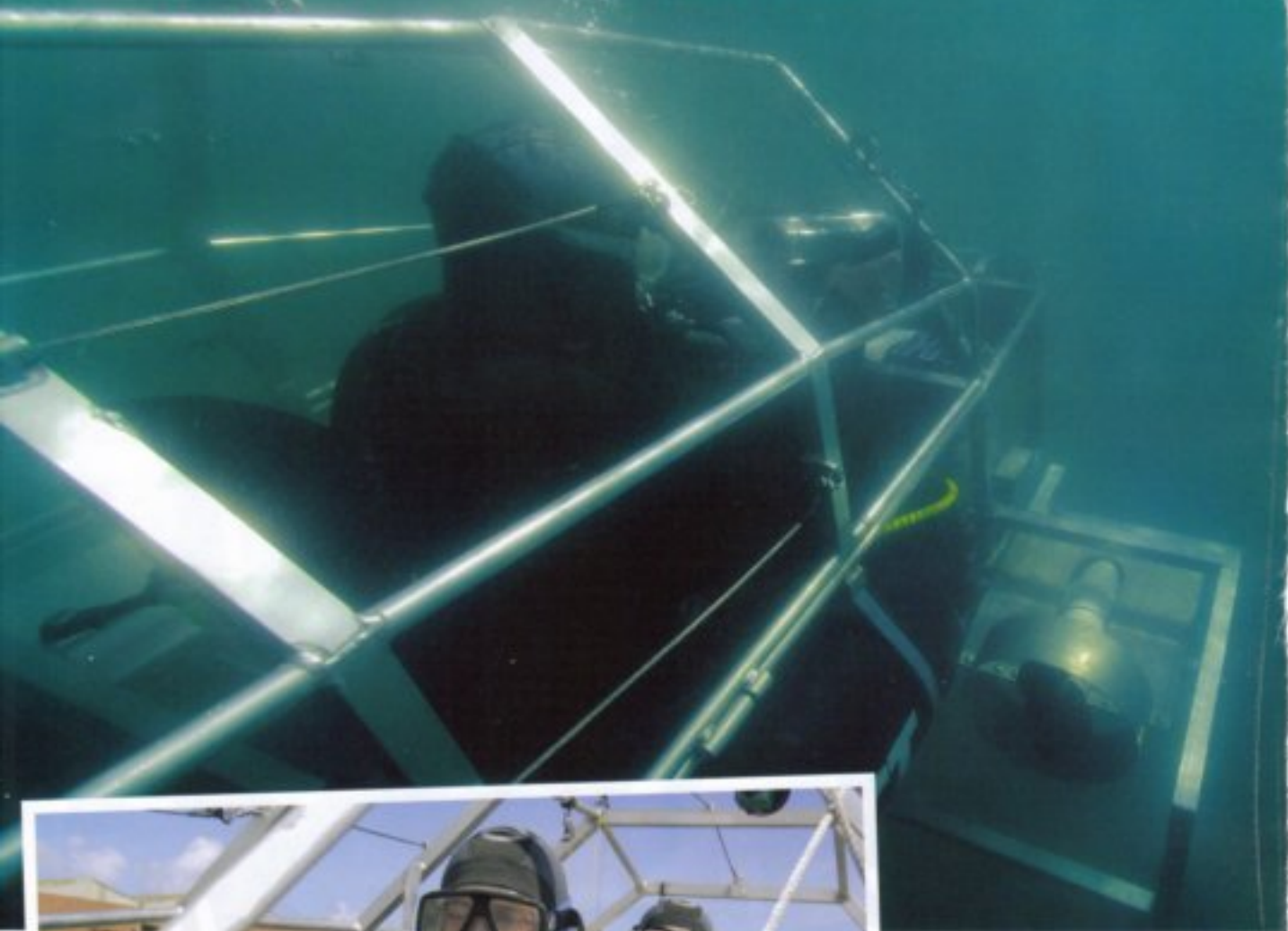
"All three of us work with each other regularly – it's very comforting to work with family," says Fabien. "When someone isn't available, someone else can pick up from where they left off."

Does diving ever become more chore than pleasure? I ask. "No, if anything it pushes me to seek further and more. It's a wonderful detachment from the mundane world." □



Great white HOPE

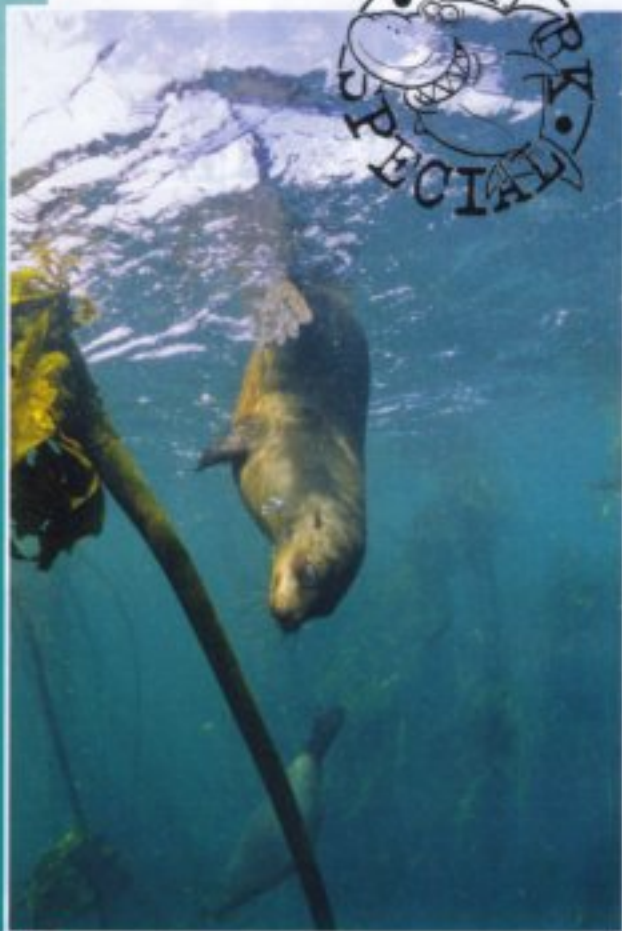
As Fabien Cousteau wrestles with his shark replicant off Mexico, off South Africa's Cape other famous divers have started using a different type of sub to mingle with white sharks. Kurt Amsler reports on the Sharksub expedition



FOR MORE THAN AN HOUR WE HAVE

been travelling up and down Shark Alley, a small passage between Dyer Island and Geyser Rock. Great white sharks gather in their hundreds here at this time of year, not for social reasons but to hunt South African sea-lions, thousands of which breed on the rock.

Visibility is no more than 4m and water temperature down here at the



Cape of Good Hope is only 12°C. Even in a drysuit, it's uncomfortable.

I guess my diving partner Andre Hartman, who is navigating the submarine, is in a worse state than me, as he refuses to wear a heavy undersuit.

But we're not giving up, because at this moment we see the profiles of seals next to the sub.

Leaving the safety of the shallow kelp forests near the islands for open water is

very dangerous for these animals, because *Carcharodon carcharias*, the shark with the serrated teeth, is lying in wait for them.

We're sure that great whites are in the vicinity. We too are bound to attract their attention, because they react sensitively to anything that doesn't fit into their scheme of things. And that must include our Shark Observation Vehicle (SOV).

Our three engines also produce a strong electromagnetic field, which should draw in all sharks within 30m. We don't want to use chum, the bait usually used for shark observation, because it interrupts the normal behaviour of the animals. Instead of attracting sharks to a boat or cage, we want to drive to where they live.

Andre attracts my attention with his acoustic buzzer and hands his slate over his shoulder. Battery level, operation time and remaining air supply is noted there – it's time to turn back.

We prefer to surface on the leeward side of the island, as it makes it easier for our supply boat. Our return journey will last some 20 minutes – our last chance for a shark confrontation.

Seals surround us, several youngsters looping round the submarine. They should be alive to the shark threat, but perhaps the sub exerts a stronger attraction than their survival instinct.

I'm starting to worry that our presence is increasing the risk to the seals when they suddenly disappear at unbelievable speed. There is no question – a shark is approaching us.

At first it's blurred. Then, ever more clearly, the outlines of a great white appear in the green water. The animal is huge, a female longer than our

Main picture: A great white shark swims straight towards the Sharksub.

Above: Cape fur seals are vulnerable to the predation of sharks.

Bottom left: Driver Kurt Amsler and navigator Andie Hartmann prepare to dive.



Clockwise from left:
A great white shark
at the surface; under
water one takes a keen
interest in the SOV;
launching the sub;
getting out past the
breakers.

submarine. This is our first shark encounter in the SOV, so we have no precedent for how to behave. Switch our engines off... continue driving... hover motionless? White sharks are very fearful animals, and any wrong reaction could prompt this one to escape.

It's already too late for such decisions. As fast as she arrived, she disappears again. I am astonished by this encounter. Even Andre, always cool after working with white sharks for years, including free diving with them in open water, is so excited that he can't keep the submarine straight. I'm not cold any more – the adrenalin has kicked in.

ALTHOUGH THE GREAT WHITE is probably the shark best known to the public, little is known about the real behaviour of this animal. Does it live in groups or alone? How and where does it mate and give birth? Does it have particular hunting techniques? Does it roam, and how far does it travel?

Science knows so little because this top predator's habitat is the open ocean, making encounters difficult to arrange.

Only in a few places, such as Gansbaai in South Africa or Guadalupe in Mexico, are the sharks sure to appear at certain times of year. Even then, poor visibility and environmental conditions can make research very difficult and time-consuming.

Until 20 years or so ago, "research" meant catching sharks and putting them on the dissection table, or keeping them alive in pools to study behaviour that could never even approximate to that in nature. Then marine biologists began to dive and study the sharks in open water.

Their more realistic results showed that 50 per cent of everything written previously in scientific papers had been more or less wrong!

Beside scientific knowledge, a vital fact soon became clear – sharks are not killers or man-eaters, and pose no great danger to swimmers or divers.

They are normal predators that follow instincts hundreds of millions years old. They hunt and eat only what they know, and it's the same menu as their ancestors enjoyed – from a time when no humans existed.

The media, however, gave out other information. The great white shark, especially, was the subject of horror stories and films, and the public's fear of them spread over onto all other sharks.

The extermination of this 450-million-year-old top predator seems inexorable and threatens the future of mankind. Sharks are at the top of the food chain, so they control the ecological balance.

"If the sharks disappear, the oceans will die – if the oceans die, we'll die!" said shark scientist Dr Erich Ritter.





Above: The Shark sub Expedition team

Only the great white, basking and whale shark as yet appear on the CITES red list of endangered species. Even then, the regulations control only the trade and export of products made of shark.

All the other 300 species can be hunted and traded without restriction and, in any case, the fishing industry can always find a way to bypass regulations. More than 150 million sharks are killed worldwide every year.

The way to fight these massacres is to create a strong lobby in favour of sharks, but who protects something of which he's afraid? Though 10 years too late, several organisations worldwide are now taking action to protect these animals.

some at a political level, some in the field, others through educating the public.

The objective of the German organisation Sharkproject is to protect sharks through supporting scientific research and – even more important – to raise awareness by communicating the facts through PR and international campaigns such as “Stop-Finning”.

Our year-long Sharksub expedition is part of this project. The submarine was designed by Sharkproject, built in Germany and tested in Lake Constance and the Baltic over more than a year.

During World War Two, Italian frogmen used similar “wetsubs”, called *maiale*. Equipped with oxygen rebreathers, they blew up British warships in the Straits of Gibraltar by attaching mines under the hulls.

Our SOV looks a bit like a space shuttle and is packed with technology and electronics. Stabilisation and trim is achieved by use of two rigid and two flexible chambers. Marker buoys, alternative air supplies, emergency surfacing aids and navigation systems

make this sub safe in any conditions. It has a speed of eight knots and a six-mile range.

The first dives off Cape Town last September, carried out in extreme conditions with big waves and currents and poor visibility, suggested certain modifications. But the SOV worked, and our adventure could start.

This year the Sharksub will operate along South Africa's west coast and support scientific groups in their work.

The research is being carried out on behalf of the South African Coastal Management Department and the scientists involved expect to gain many insights into the life of the white sharks.

The hope is to observe and record previously unseen events, such as white sharks mating or giving birth, so that pictures and footage can be shared with the public and help raise awareness of the plight of sharks.

• More information on the protection of sharks and the submarine expeditions can be found at www.sharkproject.org

HOW A MOUSE CAN HELP THE TURTLES

Kurt Amsler is not concerned only to protect sharks – his campaign against turtle-hunting in Bali is coming to a head, the police are onside and he wants us all to get involved

The island of Bali in Indonesia has been the hub of the sea-turtle trade for two decades. The market is mainly in Asia, including Indonesia itself. Turtle meat and eggs are not going to feed the poor, but are a privilege of affluent societies, while hundreds of thousands of turtles lose their lives to provide the shell for jewellery and ornaments, all unnecessary objects.

All eight species of sea turtles are threatened with extinction, so are strictly protected under the Convention of International Trade of Endangered Species (CITES). Yet the population of these animals, which have inhabited our oceans for more than 150 million years, is constantly declining.

Until a few years ago, in Bali alone, an average of 25,000 sea turtles a year were brutally cut out of their shells – alive.

Through action by local organisations and our first SOS-Seaturtles campaign in 2001, this number has dropped to around 3000, but every single life is important if the population is to be preserved.

The aim of our latest campaign is to collect as many signatures, statements and letters of protest as possible. We want the relevant

authorities of Bali and Indonesia to know that people from all over the world are focusing on Bali's sea turtles, and to stop the slaughter forever.

Indonesia and Bali are currently struggling for every tourist they can get. Tourism is very important for their economies, so anything that may harm their image is taken seriously, but this time we intend to use more pressure and less diplomacy.

SOS-Seaturtles is a non-profit-making organisation. All our campaigns and the support of ProFauna and turtle-breeding projects in Bali are financed by private sponsorship, but everyone can help.

With the Internet replacing brochures and petition sheets, we can engage far more people. Instant information about our campaign is available around the world through one mouse click, and you can sign petitions and email pre-printed statements straight to government organisations.

Attitudes are changing. Last year marine police in Bali seized a boat loaded with 158 green turtles at Sanur Beach, acting on information from a fisherman.



Bali's Chief of Police (above) attended the action in person and instructed that the turtles should be released back into the wild, while the boat was confiscated and taken to Benoa Port for examination.

After being examined, measured and tagged, the turtles were released in Kuta Beach by the Chief of Police, other officials and representatives of ProFauna Indonesia, watched by hundreds of Kuta villagers and tourists.

• To find out more or to put your name to the SOS-Seaturtles campaign, visit www.sos-seaturtles.ch