THE QUEEN OF THE DEEP

Sylvia Earle has devoted her life to protecting the world's seas. She's logged more than 7,000 hours of often perilous dives and spent decades lobbying presidents and global leaders. The legendary oceanographer is now 86 and there's no stopping her

INTERVIEW Helena de Bertodano

Dr Sylvia Earle photographed by Luisa Dörr at Alameda Beach, California. Opposite: Earle during an expedition to the Sargasso Sea in September 2010 as part of her Mission Blue campaign

be the best scientist I could, to learn as much as I could. My parents both said that being a scientist would be interesting if that's really what I wanted. But they really expected I would just get married and my husband would do the job and I would take care of the children and the house. And I could have a hobby like science. And if I didn't get married, I could be a teacher or a nurse. Or a secretary or a flight attendant. These were the four categories."

Pictures from the Fifties and Sixties show a slim and beautiful young woman. Was she aware of her looks? "I was aware that sometimes people couldn't see beyond the way I looked. And I wanted so much to be accepted as a scientist. And all they could see was a girl. I never downplayed [my looks], but I never up-played them either. Underwater in a wetsuit, you're all the same – just bubbling divers."

She didn't focus on boys or clothes at school. "There's a certain amount of culture that gets to you, no matter what. But I was not a fashionista and I wasn't panting for the whole year so I could go to the prom with the captain of the football team. I was more inclined to seek out those who liked birds and bugs and trees and things."

She majored in science at university and went on to get a PhD in phycology (the study of algae). Between research voyages, she spent a decade writing a thesis on marine algae, which was so well received that the scientific journal *Phycologia* devoted a whole issue to it. In 1969, after logging more than 1,000 research hours underwater, she applied to join the Tektite project, a pioneering programme that enabled scientists to live underwater for up to two months. Even though she had far more experience than most of the male candidates, she was rejected. "My experience is," says Earle, "you have to be at least as good as your male counterparts and probably a little bit better to get an equal chance. You have to be so overwhelmingly good they can't ignore you."

Earle refused to be ignored. The following year, she led the first all-female team of aquanauts in Tektite II. The press had a field day. "Five gals face plunge with one hairdryer" was a typical headline. They were called the "world's first real-life mermaids" and "aqua-babes". "And aqua-naughties," adds Earle with a grimace. "That was the worst."

Welcomed back by President Nixon, the "girls" were given a ticker-tape parade through Chicago. With just two minutes' notice, Earle was asked to give a speech. "Speaking in public was not my strong point," she says, but she spoke from the heart and it worked, forging her skill as a communicator. "Whether you're talking to a senator or a ten-year-old, it's pretty much the same. You've got to use language that is not the arcane language of scientists."

By then Earle had three children, two with her first husband, John Taylor, a zoologist, and one with her second husband, an ichthyologist (fish expert), Giles Mead. She went on to marry for a third time – to Graham Hawkes, a British submarine designer. "Very much my ex-husband," says Earle today.

None of her husbands could cope with her success, it seems. "It can work," she says. "I've seen so many great examples of people who are drawn to each other through a mutual respect, which makes it enduring. You become best friends. And that just wasn't the case."

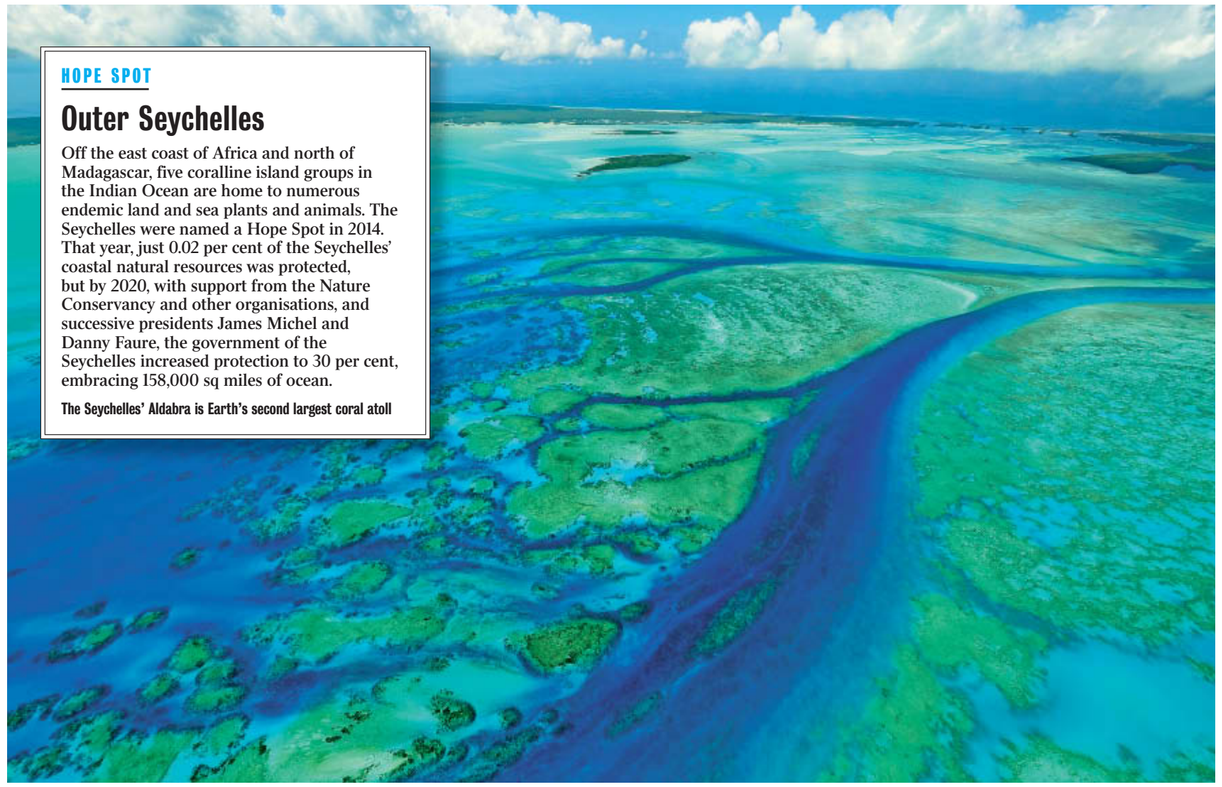
She keenly notices when men are supportive of their more successful wives. "Look at the Supreme Court judge [Ruth Bader Ginsburg]. Her husband revelled in her success. And there's a little book by a colleague, *A Lab of One's Own* by Rita Colwell. She articulates fiercely the discrimination she experienced [as a woman], but her husband was always at her side and really fostering her accomplishments. I always felt I had to hide them. It's hard to want to be the best I can be and not to be able to celebrate that with your soulmate. They don't really want you to succeed [because they feel it] belittles or puts them in the shade. They don't have the strength to realise that we're in this together. 'When you win, I win. And together we both win.' It doesn't diminish them. It should be just the opposite: 'Look at me. I got her.'"

She sighs and shakes her head. "I'd probably go crazy if I tried to analyse it. It just didn't work."

So now she lives with her daughter, Liz, and son-in-law, Edward, in a rambling house with a pond near the top of a hill outside Oakland. They have several dogs, three rescue horses, a cat, lots of fish (of course) and even at one time a pet alligator called Charlie. "My daughter is a critter whisperer," says Earle. "I never know what I'm going to find in the bathtub or the kitchen."

It is the same house she was living in when she made history – again – in 1979, exploring the seabed near Oahu in an untethered sea walk for more than two hours at a depth of 1,250ft in an atmospheric diving suit known as a JIM. She leafs through her new book, *Ocean: a Global Odyssey*, to find a picture of herself looking more like an astronaut than a diver, at the bottom of the ocean. "They had to take a segment out of the suit because my legs weren't long enough to get into the boots." She still remembers the excitement she felt. "It was just exhilarating to be among creatures that I'd only seen either pickled in bottles or dead in a net. Most stunning were the bamboo corals – pulses of blue light wherever you touched it."

The riskiness of some of her experimental expeditions cannot be understated, but Earle is renowned for her nerves of steel. Once she had to fight off a shark when she was ➡



HOPE SPOT

Outer Seychelles

Off the east coast of Africa and north of Madagascar, five coralline island groups in the Indian Ocean are home to numerous endemic land and sea plants and animals. The Seychelles were named a Hope Spot in 2014. That year, just 0.02 per cent of the Seychelles' coastal natural resources was protected, but by 2020, with support from the Nature Conservancy and other organisations, and successive presidents James Michel and Danny Faure, the government of the Seychelles increased protection to 30 per cent, embracing 158,000 sq miles of ocean.

The Seychelles' Aldabra is Earth's second largest coral atoll

> 'I never up-played my looks. Underwater in a wetsuit, you're all the same – bubbling divers'

SOS SAVE OUR SEAS: MARINE CONSERVATION

Migration protection in the Galapagos Islands
Situated some 600 miles from the South American continent, the Galapagos Islands' location at the confluence of three ocean currents makes them one of the richest marine ecosystems in the world. Its current marine protection area of 51,000 sq miles was one of the first large-scale marine conservation areas to be created. In November, the Ecuadorean government announced plans to expand the reserve by 23,000 sq miles to help protect marine life including seals, manta rays and hammerhead sharks from fishing, tourism and shipping traffic. The addition will protect an important migration highway known as the Cocos-Galapagos Swimway. In one part of the new reserve, fishing activity will be banned, although there are major challenges in ensuring that the marine reserve is properly managed and enforced.

Marine diversity in Palau
The 340 islands that make up Palau are rich with coral reefs. In 2009 Palau became the first nation to fully protect sharks and, in 2018, 80 per cent of its area was designated a no-take zone, banning fishing and mining. In just a decade, sharks and other marine populations there have increased five-fold.

The campaign against 'bycatch'
Every year, an estimated 300,000 whales and dolphins are killed by getting entangled in fishing gear, known as "bycatch". In 2017, the US added new regulations to its Marine Mammal Protection Act to require countries exporting seafood to the US to show that their fisheries were working towards reducing bycatch, but the World Wildlife Fund (WWF) still highlights a "lack of adequate regulation and/or enforcement" in many countries.

Coral bleaching and recovery
Half of the world's coral reefs have been lost since the Fifties, with coral bleaching caused by raised sea surface temperatures the biggest factor behind the loss. There is hope, however. Scientists at Australia's Great Barrier Reef have just recorded a huge spawning event with corals fertilising billions of offspring by casting sperm and eggs into the Pacific Ocean, indicating that the reef's ecological functions are still taking place despite damage.

Overfishing, illegal fishing and subsidies
It's estimated that more than 4 million fishing vessels of all sizes now ply the oceans, many with increasing capacity to catch more fish. Meanwhile there is still inadequate international co-operation to manage, regulate and control fisheries and fisheries trade. Overfishing is made worse by pervasive illegal fishing, earning criminals up to £27 billion each year, according to the WWF. Subsidies contribute to overfishing as well, it also suggests. Some of the world's richest nations pay between £10 billion and £40 billion a year, according to World Trade Organisation (WTO) estimates, to keep lagging fishing industries afloat. The WTO has spent the past two decades trying to broker an international agreement to end subsidies that reward overfishing.

Sharks, rays and chimaeras
More than one third of all sharks, rays and their close relatives chimaeras are now at risk of extinction because of overfishing, according to a new study for the International Union for Conservation of Nature. Experts found that the number of threatened species has doubled since the first global study in 2014. Three species have been classified as "possibly extinct", no examples having been recorded for 80 years on average.

The UK's no-take zones
Since 2008, protecting the waters around the Isle of Arran in Scotland against destructive trawling has led to a massive revival in marine species including king scallops and cod. Lobsters are now over four times more abundant in the no-take zone than in adjacent areas, according to research by the University of York and the Community of Arran Seabed Trust. The UK's other no-take zones are in the Medway estuary, at Flamborough Head on the north Yorkshire coast, and near Lundy Island, Devon. There are more than 350 additional marine protected areas, although many argue that, as they allow fishing, they do little to improve degraded ecosystems.

The Great Pacific Garbage Patch clean-up
Located between Hawaii and California, and containing an estimated 1.8 trillion bits of plastic, the patch – three times the size of France – is the target of a £24 million clean-up and research campaign launched by Boyan Slat in 2013 when he was just a teeanger. Now 27, he is head of the Ocean Cleanup, the organisation he founded to do the job. This year, it has successfully trialled its new System 002, which uses a towed 800m barrier to trap floating rubbish in a retention zone.

It may be nearly 14 years away, but Dr Sylvia Earle already has plans for her 100th birthday. "I have a date with Jean-Michel Cousteau," she says. "We're going to go diving."

One of the most eminent oceanographers of our time, known affectionately as Her Deepness, Earle has dived every ocean in the world, led more than 100 marine expeditions and clocked up more than 7,000 hours underwater. Since 1979, she has held the record for the deepest untethered sea walk. One of the original eco-warriors, she has been trying to tell the world about the threat to our oceans for at least half a century. The Library of Congress has recognised her as a Living Legend and in 1998 *Time* magazine named her its first Hero of the Planet.

Now 86, she will turn 100 on August 30, 2035. Cousteau, the French oceanographic explorer, will be 97 by then. "Jean-Michel laughs about [our date] all the time," she says. "We don't know where we will dive yet. Maybe it will be on a submarine."

Nothing irritates her more than people thinking her age might be a barrier. "People shouldn't assume that because I'm in my eighties I can't dive. It's in my DNA. I can't imagine not doing it. You don't have to be Superman to be an effective, safe diver. Somebody else shouldn't judge for me. I know my own limitations."

Until her 100th birthday, Earle is on a continuing mission to save the oceans, especially from commercial fisheries, which do incalculable damage to the marine ecosystem. In her lifetime she has seen heartbreaking damage. "It's taken four and a half billion years to establish a planet that was favourable to us," she says. "And it's taken us about four and a half decades to significantly unravel those systems. We have altered the nature of nature."

We meet in Alameda, near San Francisco, at DOER Marine, a marine technology company established nearly 30 years ago by Earle to develop remotely operated vehicles for deep-sea exploration. She has just flown in from Cop26 in Glasgow, where she appeared on a panel with John Kerry, Stella McCartney and Al Gore, and called for a ban on industrial fishing on the high seas, stressing that it was as important to the future of the planet as curbing fossil fuel use.

A petite figure in a royal blue fleece top and dark blue trousers, she is a dynamic force, issuing bold statements with a disarming smile, such as, "Eating fish is repulsive," and, "We have to stop the killing. Period."

First, she shows me a vehicle she helped develop, which operates and records images more than a mile underwater. Amazing how much one can do now, I comment. "Amazing how much still needs to be done," she replies. "We've mapped only 15 per cent of the ocean floor." We go upstairs to her office, which could almost be a museum with its rotating globe, telescope, old-fashioned copper diving helmet, pieces of coral and awards galore.

With Barack Obama on Midway Atoll, September 1, 2016

Earle, right, with her Tektite II team after completing two weeks living underwater in the Caribbean, July 1970

'Eating fish is repulsive,' she tells me. 'We have to stop the killing. Period'

Earle exploring the seabed at Great Lameshur Bay in the US Virgin Islands during the Tektite expedition

She recently returned from diving in the Azores and has many expeditions planned in the next few months. "The Galapagos next July, the Indian Ocean next fall, Antarctica in February 2023." These trips are not just for fun. They are Hope Spots set up by Earle under her Mission Blue programme, more than 130 places that are scientifically identified as critical to the health of the ocean.

"I'm all for giving the kids a chance," she says, expanding on her objections to ageism, "but disagree that past a certain age, you're probably not as sharp as the job requires. For some that's absolutely true, but it's also true of 20-year-olds. I find it annoying to be lumped in a category. It gets in the way of communication. How about looking at who you are rather than what you are?"

So who is Sylvia Earle? Born in 1935 in New Jersey, she grew up in a farmhouse with two brothers. Her father, whom she describes as "one of the best humans ever", was an electrical engineer and her mother was known locally as "the bird lady", due to her ability to tend to any injured creature. As a young girl, Earle would spend hours collecting jarfuls of waterlife from a nearby pond and filling notebooks with her observations. "It was idyllic, even though it was wartime," she says. "It had woodland all around it and we had about an acre of asparagus."

Before the birth of her older brother, her parents had experienced almost unimaginable loss. Four older children had died, their first in a car crash as a teenager, their second from an ear infection, aged nine. Then they had twins, born prematurely. One survived for a few months, the other just over a year. "How do you keep going after that?" asks Earle. "I think that would destroy some people. It didn't destroy them. They stuck together and I never heard a harsh word between them. So I was really lucky. I think they probably appreciated my brothers and me even more because they had lost four others."

She first visited the sea on a family holiday when she was three. "Even before I got to the waves, I could smell the ocean, a great salty seaweed kind of smell." She ran into the water and was immediately knocked over by a wave. "My mom could have raced in and grabbed me and said, 'You're never going back in the ocean again. It's too dangerous out there.' But no, I've been jumping back in ever since."

When Earle was 12, the family moved to the western coast of Florida, to a house beside the sea. "The Gulf of Mexico became my backyard," she says. At school, she found herself drawn to the sciences. "I wanted to ➡

HOPE SPOT

California seamounts

Along the California coast, underwater mountains and volcanoes shelter lush marine life. The biodiversity promotes fuelling stations for migrating seabirds and endangered blue and grey whales, and the seamounts are home to rare corals that take hundreds of years to grow. Once threatened by trawling, offshore drilling and ocean acidification, the area has been protected as a Sylvia Earle Hope Spot since 2019.

A giant ray swims through seagrasses on a California seamount

PREVIOUS SPREAD: SHAUL SCHWARZ/GETTY IMAGES. PAGES 58/59, 60/61, 63: PHOTOGRAPHY FROM NATIONAL GEOGRAPHIC'S OCEAN: A GLOBAL ODYSSEY BY SYLVIA EARLE. THIS SPREAD: ALAMY, BETTMANN ARCHIVE/GETTY IMAGES, AP PHOTO

HOPE SPOT

Spitsbergen Island, Svalbard archipelago

Between mainland Norway and the North Pole, the Svalbard archipelago is full of glaciers and fjords with waters rich with marine species. The Svalbard Hope Spot – where species from auks, puffins and polar bears to walruses and minke whales all thrive – was first named in 2018.

A beluga whale in Arctic waters

scuba diving by giving it a firm kick on the snout. Far more dangerous was the possibility of equipment failure: interruption of her air supply or a leak in the diving suit that would have subjected her to such tremendous water pressure she would have been crushed to death.

She dismisses any talk of bravery and says she has never felt in any real danger underwater. Much more frightening, she says, are "crazy people coming my direction on the highway. After all, there's just paint down the middle of the highway. And a mutual desire to live."

In 1990, Earle became the first female chief scientist at the National Oceanographic and Atmospheric Administration, where she was responsible for monitoring the health of the ocean. The role earned her the nickname "Sturgeon General" and she resigned two years later saying the job prevented her from speaking her mind. "It was very confining," she says. "I was not welcome at meetings because I called them out [on fishing policies]. More than once I was called into the secretary's office and told, 'You're a team player.'"

But she wasn't. Her only team is the marine life. "I'm just trying to be a voice for the ones who don't have a voice," she says. "That is who I am. No matter what. So I do get into trouble when I say we've got to stop taking fish on an industrial scale. We have commodified fish and shrimp and lobsters. They're every bit as much a miracle as any other living thing. And to casually kill them as commodities by the tonne is really indefensible.

"I am so frustrated that others don't see it, even some of my fellow scientists, who really should know the pain they're inflicting on animals in the ocean. Why would you wish harm to a remarkable creature like a lobster or a crab or a squid or an octopus once you know them and understand their deep history? We're all in this together."

Does she despair sometimes? "If I allowed despair to seep in, I wouldn't be as motivated as I am." Besides, she says, there is cause for optimism. "There are more turtles today in the ocean than when I was a kid. More whales too. We haven't lost a great whale species yet." But there is no room for complacency. "We've lost other mammals, such as the monk seal in the Gulf of Mexico. We're on the edge of losing the vaquita, the little dolphin in Baja California."

Intensely driven and indefatigable, Earle never takes a day off. "I love what I do, so if I had a day off, I would do what I'm doing. I can't just sit back and watch the world fall apart. Like Greta Thunberg says, I don't want hope; I want action. We've got to move from decline to recovery. We shouldn't even pause to think, will we do it or not? We're going to do it. We have to reverse this."

> 'Like Greta Thunberg says, I want action. We have to move from decline to recovery'

Darkness has fallen. There is no lighting in her office – apart from a faint glow from the streetlights outside – but Earle doesn't seem to notice. On she talks and on, her energy and eloquence undimmed. I am reminded of a quote from a close friend of hers, the ichthyologist John McCosker, cited in a *New Yorker* profile of her in 1989: "I think Sylvia may have mellowed a bit in recent years, and thank goodness, because her magnetism and dynamism are almost impossible to keep up with. I mean that Sylvia, in her most enthusiastic state of life, is just too hot to handle."

I would venture that, 32 years on, Earle burns as brightly as ever. ■

Ocean: a Global Odyssey *by Sylvia Earle is published on December 23 (National Geographic, £45). As part of the Times+ Times Earth series of events, Sylvia Earle talks to Lucy Siegle about her life's work and latest book on January 27. Register at mytimesplus.co.uk/events*