



# SEA CHANGE

Can former pirates help scientists study troubled waters? *By David Grimm*



Laura Sánchez Alòs had been at sea for less than 20 minutes when the motorboats attacked. In late January 2019, the 24-year-old Spanish conservation biologist was on board the *Farley Mowat*, a former U.S. Coast Guard cutter, in Mexican waters in the northern Gulf of California. She was the ship's scientist, part of a campaign by the Sea Shepherd Conservation Society to study and protect the vaquita, the world's smallest porpoise and most endangered marine mammal. Since 2015, the organization had been patrolling this region—and making local fishers increasingly angry.

Sánchez Alòs was here to document the size and number of nets placed in the water to snag the 100-kilogram totoaba, a fish so highly valued for its swim bladder in traditional Chinese medicine and cuisine, it's known as the "cocaine of the sea." But the illegal nets snare vaquitas as well, and she and her colleagues were also yanking up the nets and destroying them.

Suddenly, nearly two dozen motorboats surrounded the *Mowat*. The men aboard hurled insults, calling the Sea Shepherd crew invaders and slicing their hands across their throats in an "I'll kill you" gesture. Then they

began to throw rocks, iron sinkers, and Molotov cocktails. The cutter blasted the attackers with firehoses, but a large rock crashed through the ship's front window, showering glass across the bridge. A few minutes later, a Molotov cocktail set fire to the *Mowat's* port side. The ship turned its hoses on itself to extinguish the flames, then zoomed out of the fray, pockmarked but intact. "Either they couldn't follow us anymore," Sánchez Alòs says, "or they ran out of rocks."

The incident was a turnabout for an organization used to being on the offensive. For more than 3 decades, Sea Shepherd had made a name for itself as a militant conservation group, sinking whaling vessels, throwing its own projectiles at illegal fishing boats, and generally conducting itself as a vigilante of the high seas. The group's head, Paul Watson, has been branded a pirate and a terrorist.

Yet the Sea Shepherd Conservation Society appears to have undergone a dramatic transformation in the past 8 years. It has abandoned militant tactics in favor of new leadership and a new mission: Protect the oceans not with violence, but with science. Call it a sea change.

The group has just hired its first director of science and begun recruiting research-

ers from across the globe. By early next year, it hopes to have a dozen vessels that will help it fill an urgent scientific need: ferrying scientists, especially those from less developed nations, to understudied parts of the ocean. There they can survey endangered animals, search for new species, and even board illegal vessels to collect firsthand data on overfishing.

"We can't do what we want going forward without science driving us," says Pritam Singh, who effectively took over for Watson in 2014. "Science will be our primary mission—not an afterthought."

The pivot couldn't come at a better time for marine research. The U.S. government's scientific fleet has shrunk by one-third over the past couple of decades, according to some estimates. Time on research vessels can take years to procure—if investigators can get on at all. And overfishing, pollution, and climate change are roiling the seas in ways researchers are struggling to measure.

"There are a lot of good ocean scientists, but they're stranded on shore," says Douglas McCauley, a marine ecologist at the University of California, Santa Barbara.

Sea Shepherd's vessels could be their route to sea. But most of its ships are relatively small and only outfitted with basic

PHOTOS: (LEFT TO RIGHT) MELISSA ROMAÑO/SEA SHEPHERD; JACK HUTTON/SEA SHEPHERD





Sea Shepherd Conservation Society ships monitor a vaquita refuge in the Gulf of California, where scientists aboard the *Sharpie* (far left), scan for the rare porpoises.

scientific equipment. And the organization itself will need to shed its past and commit to robust and transparent science, McCauley says. “It will take a rather significant about-face, but it could be really transformative,” he says. “We are looking at a rough next few decades for the ocean, and we need all hands on deck.”

**SEA SHEPHERD TRACES** its roots to 1977, when Watson was ousted from the board of Greenpeace for his controversial tactics. He formed Sea Shepherd that year and soon developed—and embraced—a reputation as a brash and militant leader. He wore a captain’s uniform, holstered a knife, and flew a skull-and-crossbones-like flag on the ships he commanded.

For the next several decades, Sea Shepherd crews operated like vigilantes in the name of conservation. They dropped spiky steel “net rippers” onto the ocean floor to tear up trawling nets, lobbed smoke bombs onto boat decks, and threw rancid butter to taint whale meat. From 1979 to 1994, Watson claims his group sunk five whaling ships and scuttled two more.

The campaigns, chronicled in the TV series *Whale Wars*, disrupted illegal fishing, dolphin hunts, and whaling around the

globe. But by the early 2010s, Interpol had declared Watson an internationally wanted fugitive and a U.S. federal court labeled his crew “pirates.” Critics also charged that the group’s tactics had largely backfired, bolstering pro-whaling sentiment in places like Japan and Iceland. “[Watson’s] involvement in all of this is an absolute disaster,” Sidney Holt, one of the main architects of the first whaling moratorium, told *The New Yorker* in 2007. “Almost everything he has been doing has had blowback for those who want to see an end to whaling.”

Watson, who contends his efforts saved countless marine animals, stepped away from the Sea Shepherd Conservation Society in 2014, says Singh, although Watson continues to direct other arms of the movement, including Amsterdam-based Sea Shepherd Global. Singh, a wealthy developer and environmentalist, and Roger Payne, a leading expert on whale behavior, had recently joined the board of the U.S.-based Sea Shepherd Conservation Society, and began to steer a new course. “By the summer of 2014, we were re-evaluating how best to accomplish our mission of protecting marine wildlife,” Singh says. “It required a complete change of direction in terms of culture and approach.”

The Sea Shepherd movement turned more of its focus toward overfishing and began to collaborate with foreign governments to help them monitor their waters. A major turning point came in 2015 when Sea Shepherd Global’s *Bob Barker*—a former whaling ship painted with shark jaws on the bow—chased an illegal fishing vessel, *Thunder*, for 110 days and 10,000 nautical miles. The pursuit, the longest in maritime history, ended with the scuttling of the trawler and the arrest of its captain. A U.S. Navy report later called the campaign a “game changer” for the Sea Shepherd movement. “It was now operating with nation states in a legitimate protection of fisheries,” the report stated. “The organization has succeeded in countering illegal fishing where private maritime security companies had hoped but failed.”

The Sea Shepherd Conservation Society added more ships to its fleet and launched a campaign of what Singh calls “radical collaboration,” inking agreements with a number of Latin American countries to fight poaching and overfishing. It also began its first forays into science. The group dedicated the *Martin Sheen*, a 23-meter yacht, exclusively to research, and started to conduct preliminary science missions on other vessels, including surveys of the vaquita.



Singh credits the science push to Payne. “Roger wanted to know how many species were being overfished, how many sharks were being killed for finning, and whether Sea Shepherd’s efforts were affecting these numbers,” he says. “In many countries, no one is collecting this data. We realized we had the resources to do this for the first time.”

But first, the group needed a chief scientist.

**JOHN PAYNE**, then an independent researcher, ran into Singh by chance last summer in Vermont. The son of Roger, he spent his early life around whales and became

five fish may be thrown back dead as “by-catch,” and about one-third of the world’s fish are caught at unsustainable levels (*Science*, 11 January 2019, p. 112).

Yet those numbers—used to inform everything from government regulations to conservation efforts—are just estimates, Payne notes. A single 2009 study is still the most cited paper on the global extent of illegal fishing, he says. “The oceans are cloaked in mystery,” he says. “It’s hard to do anything about illegal fishing because we don’t know the scope of the problem.”

That’s where the Sea Shepherd Conservation Society’s navy comes in. It currently

that,” says Ray Hilborn, an expert on fisheries at the University of Washington, Seattle. “They could survey the seas in ways no one else can.”

Sea Shepherd can also offer marine scientists a faster, cheaper route to sea. The U.S. Academic Research Fleet encompasses 18 vessels, and other federal agencies such as the National Oceanic and Atmospheric Administration (NOAA) also operate ships of various sizes used for research. But it can take up to 5 years to secure a grant to get on these boats, and costs can exceed \$100,000 per day on a large research vessel. “A 2-week expedition can eat up an entire grant,” McCauley says. Sea Shepherd crews are mostly volunteer, which keeps costs down. Payne says scientists should be able to board its ships in a matter of months, not years.

The organization also promises to bring researchers to rarely frequented marine protected areas, giant swaths of ocean that restrict fishing and other activities. “Many developing countries don’t have the resources to patrol their areas, so even their own scientists have trouble getting out to these locations,” Payne says. Sea Shepherd ships already doing conservation work could bring researchers onboard to document animal populations and behavior, as well as water conditions such as temperature and salinity.

The same could go for the open ocean. “There are a lot of places in the world where we have no idea what the fishing impacts are,” says Les Watling, a biological oceanographer at the University of Hawaii,

Manoa. “It would be absolutely delicious to go somewhere no one has been.”

Sea Shepherd’s preliminary scientific efforts have borne fruit. The *Martin Sheen* has been sailing to the Guadalupe Island Biosphere Reserve, which encompasses several small islands off the Pacific coast of Baja California, since 2016. On the trips, marine biologist Gustavo Cárdenas Hinojosa of Mexico’s National Commission of Natural Protected Areas studies the behavior and vocalizations of elusive beaked whales, which are vulnerable to sonar and other humanmade noise. Before he got involved with Sea Shepherd, he says, his trips were so limited, it took him 3 years just to spot 31 whales. In his first 3 weeks on the *Martin Sheen*, he saw 45.

With photographs, underwater microphones, and DNA samples from tissue



A beaked whale surfaces during a survey by the Sea Shepherd Conservation Society’s *Martin Sheen* off Baja California.

a marine ecologist. He had no interest in joining Sea Shepherd under Watson’s reign. “If Paul had asked, I would have said no,” he says. “Their confrontational approach wasn’t a good match for my skill set.”

Singh invited the younger Payne to his lodge in southeastern Alaska, where the two watched salmon swim up the region’s rivers. Like his father, Payne sought hard data. “I object to the way a lot of animal rights and conservation organizations are careless with facts,” says Payne, who became Sea Shepherd’s director of science in October 2021. “I wanted to help, and I wanted to make sure what we said was accurate.”

Numbers on the state of the oceans are blurry. It’s thought, for example, that global fish consumption has doubled over the past 50 years. Up to one out of every

has five vessels and is adding three more by the end of the summer; by early next year, it plans to have a dozen, ranging from the 24-meter *Martin Sheen* to a 41-meter former Japanese research ship. The ships venture into remote waters others often avoid because of violence or harsh weather, such as the northern Gulf of California and parts of the Southern Ocean. Sea Shepherd groups also have unique partnerships with several countries that allow them to board fishing vessels and gather catch data. In the waters off Liberia and Peru, for example, Sea Shepherd crew, in conjunction with the countries’ coast guards, are authorized to inspect cargo holds, cataloging the size and types of fishing nets and the weight, number, and species of fish being caught.

“I don’t know anyone else who can do

(obtained with darts), Cárdenas Hinojosa and his colleagues have uncovered new insights into beaked whale birthing patterns, family structure, and socialization. They have also identified a possible new species. “We simply would not be able to do this work without Sea Shepherd,” he says.

A handful of other scientists have used Sea Shepherd ships to study the impact of human activity on humpback whales in the Pacific, shark behavior off the coast of Gabon, and river dolphin populations in the Amazon. Other studies have tested sperm whales in the Gulf of California for pollutants, which John Payne says “may be the biggest threat to whales post-whaling.”

But these projects are just a drop in the ocean. What Payne needs now is for more scientists to climb aboard.

**WHEN IT COMES TO** Sea Shepherd’s past, Hilborn doesn’t mince words. “A bunch of lunatics conducting campaigns that were internationally criminal and a total waste of time,” he says. (Watson counters that he and his colleagues have never been convicted of a felony.) But Hilborn is cautiously optimistic about the Sea Shepherd Conservation Society’s change in direction. “Shedding Watson gives them a lot of opportunity for re-branding,” he says. He adds that John Payne is “a good choice” as director of science. (Hilborn served on Payne’s Ph.D. committee and has worked with him as a consultant.)

Still, Hilborn and others say the organization faces steep challenges if it wants to become a scientific powerhouse. One is equipment. High-powered binoculars are among Sea Shepherd’s fanciest scientific devices. In contrast, traditional research vessels have dedicated scientific equipment, personnel, and labs. On the *Farley Mowat*, “a laptop is really pushing it,” says Barbara Taylor, a biologist with NOAA’s Southwest Fisheries Science Center who surveyed vaquitas from the ship.

Bruce Applegate echoes those concerns. He leads ship operations at the Scripps Institution of Oceanography, which operates three major scientific vessels and a collection of smaller coastal research ships. His biggest, the 83-meter *Roger Revelle*, bristles with high-tech scientific instruments, including a deep-water mapping system, gravity meters, and long-range Doppler so-

nar. It can also accommodate underwater remotely operated vehicles (ROVs), hosts well-equipped laboratories, and carries a paid scientific crew to operate instruments. “Doing science right takes an extraordinary amount of work,” he says.

Payne admits Sea Shepherd ships can’t rival the *Revelle*. Still, he says, they “are large, stable platforms that can operate in any weather,” and will support most of the types of research his organization wants to do, such as surveying biodiversity, verifying catch data, and observing marine animal behavior. Hilborn adds that Sea Shepherd could easily add more instrumentation.

Hilborn also worries the group won’t publish results that conflict with its mission—if it finds, for example, an abundance of species in an area thought to be overfished. It could create an impartial scientific board to help design and evaluate studies, he suggests.

John Payne is currently assembling an independent board to do just that. “We are committed to full transparency,” Singh says. “Your data is your data. We don’t censor.”

Applegate would rather the Sea Shepherd Conservation Society used its money to fund more established scientific ventures. The organization could cover ship time for scientists, for example, or partner with Scripps as another nonprofit has done. Still, he says, if the group plunges deeply into its own research, he would judge it on its merits. “I would pay more attention to the scientific rigor than to, ‘Hey, these guys used to wear pirate masks.’”

**JOHN PAYNE NOW** spends his days calling up scientists and mapping out his organization’s research future. After reaching out to more than 100 academics around the world, he says, “there is a lot of interest in using Sea Shepherd ships for science. I think we’ll be turning away a lot of people.”

He aims to request research proposals for ship time by the end of the year and hopes to collaborate with hundreds of scientists within 5 years.

Interest from the developing world is especially high, he says, as academics there struggle even more for access to re-

search vessels. What Sea Shepherd could provide in these regions is “very important,” Cárdenas Hinojosa says.

Sánchez Alòs agrees. Undeterred by her run-in with the fishers, she’s still trying to track vaquitas in the Gulf of California. Sea Shepherd’s interactions with the locals have become less intense, she says. That may be because the organization no longer yanks nets from the water; now it just tells the Mexican navy where to find them.

Sánchez Alòs is also helping build and maintain a database of all of the information Sea Shepherd ships are collecting. “We’re trying to paint a better picture of what’s going on in our seas,” she says. “I’m sure the science is just going to keep growing—it’s what the world needs.” ■



Peter Hammarstedt, a captain with Sea Shepherd Global, investigates the cargo hold of a fishing trawler off the coast of West Africa.

“It’s all solvable by money.”

The Sea Shepherd Conservation Society currently brings in more than \$12 million per year in donations. Payne hopes to use some of that on a \$100,000 echosounder to acoustically measure fish populations. “We don’t have unlimited money for equipment,” Singh says. “But if we needed something like an ROV, we’d try to make it work.”

Hilborn is more concerned about the organization’s ability to balance its scientific goals with conservation. After all, its donors and volunteers are motivated by a desire to save the whales, not measure salinity. “You need to go back to the same place over and over again for scientific surveys,” he says. “You can’t do that if you’re chasing bad guys across the ocean.”