

Troubled Waters

Half of the Fish Caught in Mexico's Sea of Cortez are Captured Illegally. Here's what one Group is doing to Preserve "The World's Aquarium" for Future Generations, and What You can do to Help

Near the southernmost tip of the Baja California Peninsula, the jewel-like waterfront of the Marina de La Paz shimmers in the summer heat. I'm holding a jacket and a couple of cameras as I step off the Marina's docks and aboard a 26-foot panga (open boat) called the *Dueno de la Noche* (Owner of the Night). Tonight, I'm the guest of a two-man team that will spend the next 16 hours on this moonless evening scouring the Bay of La Paz and nearby islands in a sometimes dangerous cat-and-mouse hunt for illegal fishermen.



Paradise in Peril: For decades, Mexico's Sea of Cortez has been one of the most productive fisheries in the world. Now it is near the brink of collapse due to under-enforced regulations and severe overfishing

Hundreds of hookah divers, gill-netters, trawlers, shrimp boats and long-liner fishermen are all part of an illegal flotilla that is systematically stripping the Bay of La Paz and much of the entire Sea of Cortez and its reefs of every type and size of fish, lobster, squid, sea cucumber, clam, oyster, shark, manta ray, billfish, shrimp, seashell and practically anything that is saleable.

Rick Brusca, a marine biologist and former director of conservation at the Arizona-Sonora Desert Museum in Tucson has estimated that half the fish captured in Mexico are caught illegally.

Our objective tonight is to find fishermen using hookah diving equipment to spear or net hundreds—sometimes thousands—of pounds of reef fish per boat. Hookahs are small gasoline-powered air compressors that deliver a virtually unlimited supply of air to a diver through a long hose that lets them scour reefs to a depth of 40 meters (140 feet) or more. Hookah divers' favorite time to fish is on moonless nights, long after official patrol boats have retired for the day.

A generation ago, SCUBA diving pioneer and underwater film maker Jacques Cousteau famously dubbed the Sea of Cortez “The World’s Aquarium.” He’s honored with a larger-than-life bronze statue on the boardwalk in downtown La Paz. Today, Cousteau might not recognize his beloved aquarium.

Fishing the Sea of Cortez is big business. Estimates place the total annual value of the catch at US \$500 million, an amount equal to half the country’s yearly fisheries productivity. The other half comes from fisheries in the Pacific Ocean and the Gulf of Mexico.



This boat, the Tiburon Maco, was photographed while setting illegal gill nets

According to Mexican statutes, it’s not enough to find hard evidence of illegal fishing. You have to catch the fishermen—physically observe them—in the act of breaking the law. Aboard *Dueno de la Noche*, we’re carrying night-vision binoculars, a powerful spotlight, and cameras. For the next 16 hours, we will motor about 110 kilometers (70 miles) around several islands, including Espiritu Santo, Isla Partida, and the magnificent marine reserve at Los Islotes, with its needle-eye, arched granite spire that juts vertically from the sea bed.

This is *Observatorio Ciudadano*, or Citizens’ Observatory at Work

The group was formed in 2009 by a group of influential Mexicans and Americans alarmed by the accelerating depletion of the fisheries in the Sea of Cortez. The destruction was especially evident on the near-shore reefs. That year,



SeaWatch Founder Mike McGettigan being interviewed for a segment on the Sea of Cortez that aired on Mexico's Televisa network

American Mike McGettigan took observers aboard his 75-foot boat, the Ambar III, for a first-hand look at destruction caused by illegal fishing. As a result of that three-day cruise, SeaWatch, the organization McGettigan founded in 1993, teamed with La Paz-based [Noroeste Sustentable](#) to form *Observatorio Ciudadano*. “We do our work at night,” says founder McGettigan. “That’s when 90 percent of the illegal fishing takes place.” Today the group operates two pangas, each labeled with huge bold black letters on the sides of the hull. McGettigan also patrols the Sea of Cortez aboard Ambar III. McGettigan has also set up an informal network of boaters who relay information on illegal fishing to *Observatorio Ciudadano*. A major goal of [SeaWatch](#) goal is to try to stem the massive illegal haul that is stripping the fish population from the Bay of La Paz and surrounding areas. (Want to help? See the end of this article for a listing of nonprofit organizations with excellent programs in place to help preserve the Sea of Cortez).

Keen Hearing: The Most Potent Ally in the Nightly Hunt for Illegal Fishermen

My guides for this trip are 43-year-old Alberto “Beto” Guillen, originally from Mexico City, but who has lived in La Paz for the past 22 years. Alberto’s smooth-skinned, slightly rounded face breaks into an easy smile when he speaks of his ten-year old son. Many years ago, he, too, was a fisherman—a legal one—who used only lines and hooks. Later, he studied biology at Universidad Nacional Autónoma de México (UNAM) in Mexico City, the largest university in the country. He also attended the Universidad Autónoma de Baja California, (UABC) in La Paz where his studies concentrated on marine mammals such as whales and dolphins. He worked in a biology lab for three years. Since 2009 when he began scouring the Sea of Cortez as part of *Observatorio Ciudadano*, he’s reported 32 illegal fishing operations.

On this pitch-black night, Beto’s ears are his most potent weapons. Just by listening he knows the make, speed and horsepower of a boat’s outboard motor as it skims past. And, like a bat honing in on a buzzing mosquito, he listens for the faint nighttime whine of hookah motors.



To the right in this photo is Alberto “Beto” Guillen. Next to him in the tan Jimi Hendrix T- shirt is driver Erick Casillas

With Beto and I this night is another first-timer, although he has much more fishing experience than I could ever claim. Thirty-seven year old Erick Mauricio Salgado Casillas is a La Paz native who comes from a multi-generational family of fishermen. Mauricio has worked as a tourist guide and fisherman since he was sixteen. Tonight, he’s driving our boat. Meanwhile, aboard Ambar III, Mike McGettigan will patrol the peninsular coastline about 65 kilometers (40 miles) north of our route and relay any illegal fishing he discovers to *Observatorio Ciudadano*, where it will be forwarded to fishing authorities.



The Citizen’s Observatory uses this panga to patrol the waters of the Sea of Cortez in the hunt for illegal fishermen

We leave the protected waters of Marina de la Paz and Mauricio guns the 140-horsepower outboard toward Espíritu Santo Island, with its turquoise water, sandy-bottomed bays and arid, cactus-studded hills. *Isla Espíritu Santo*, or Island of the Holy Spirit, is a magical place. The island is 32 kilometers (20 miles) long and only 9.6 kilometers (6 miles) across at its widest point. At low tide, you can walk across a sandy shoal to neighboring Isla Partida, and you can see these unpopulated islands from almost anywhere in La Paz.

These islands are a locus for gigantic, harmless spotted whale sharks that ply clear waters feasting on microscopic plankton. In winter, Humpback and Gray Whales come here to mate and frolic in joyful displays of leaping, spy-hopping and tail-slapping the water. Dolphins race up to our boat, only to disappear as fast as they came. Enormous manta rays and hundreds of their slightly smaller cousins, mobula rays, put on a spectacular aerial displays. I watched one mobula ray leap two meters out of the

water and, like an Olympic gymnast, stick a perfect water landing, then keep jumping again and again. Jet-black frigate birds circle overhead while brown pelicans dive-bomb the waters for fish. The big birds tilt back their heads, and I watch as V-shaped fish tails wriggle in their rubbery, fleshy pouches before sliding down long snake-like necks. Pelicans are excellent fishermen: biologists estimate that adult pelicans catch a fish on about two-thirds of their dives. Espiritu Santo's rocky promontories are drizzled with a frosting of snow-white guano, a testament to the teeming life in the Sea of Cortez.

Espiritu Santo is one of about 900 islands in this great bay, which, in Mexico, is usually called the Gulf of California. It's the world's youngest sea, and only started forming about five million years ago when part of the Pacific Tectonic Plate broke away from the North American plate.

The biodiversity of the Sea of Cortez is staggering. Biologists think that the region's 6000 or so recorded species may actually be 30 percent higher. Nearly 1000 species of fish live here, 5000 invertebrates, and hundreds of types of birds. Rare and spectacular mammals also live and breed here, including the largest animal that has ever existed—the blue whale. In the northern part of the Sea, the Vaquita, a four-foot-long, cuddly-looking, short-nosed porpoise is making a last stand. First discovered only in 1958, Vaquitas today have a population estimated at 97 individuals—about half of the number that existed only 20 years ago. Their most deadly enemy: drowning in gill nets.



Near dusk, we spotted these men fishing legally using only hooks and hand lines. Legal fishermen dislike those fishing illegally, and will often turn them in to authorities.

As soon as we motor out of port, Beto and Mauricio begin logging a record of every boat we spot. They're taking the pulse of the evening. In a thick spiral-bound notebook, Beto records a few sailboats underway, and a couple of pangas loaded with tourists returning from a day trip to Espiritu Santo. Beto peers through his binoculars and notes four pangas, with two fishermen each. "I know those guys," he says in Spanish. "They're OK." In the summer, this is the routine three nights a week. During winter, when frigid winds sweep down the Sea of Cortez from the far north, their outings drop to two nights per week. It's tricky

business to find illegal boats. They run at night without bow or stern lights and the fishermen aboard know every hiding-place rock and inlet for miles in all directions.

Arrests and Jail Time Save Hundreds of Tons of Fish in The Sea of Cortez

Since *Observatorio Ciudadano* began, there have been notable successes as well as some setbacks. Back in 2009, McGettigan counted about 28 boats illegally fishing full-time in the Bay of La Paz. Once illegals were spotted, *Observatorio* crews took photos, recorded names, and filed *denuncias*, or official complaints, with Conapesca, the Mexican government body that regulates fishing. Photos of illegal fishermen were published in local papers. Some fishermen paid fines, while others paid bribes to corrupt officials in Conapesca and Profepa, the Mexican bodies that regulate fishing and natural protected areas. A few fishermen served jail time. For a while, the number of illegal boats dropped. Fishermen found other jobs. Some left the area. "In the first year, the number of illegal boats dropped by 80 percent. We probably saved more than 500 tons of illegal fish from being harvested from the Bay of La Paz," McGettigan estimates. At one point there may have been as few as two outlaw boats still operating. But as word got out that officials refused to take action on the *denuncias*, or could be easily bribed, the number of illegals has slowly crept back up.

"I'm passionate about anything that is so unjust that it is taking the future away from all Mexicans. It drives me nuts," Mike McGettigan says. "Officials are the ones destroying the sea, it is not the fishermen or even illegal fishermen."

McGettigan, an avid fisherman and spear fisherman, has devoted the last 20 years of his life to educating people about the need to conserve the fisheries in the Sea of Cortez. Since the 1980's he's watched the fish populations plummet, and is determined to continue efforts to fight overfishing, despite paying a hefty price.

He's been called a "crazy gringo" in person and in the press. He's been threatened with deportation by the Mexican government. In his motor yacht he's been chased for five hours by a Mexican seiner crew that was infuriated when McGettigan positioned the Ambar III over a school of tuna at Roca Partida Island, and prevented the big boat from setting illegal nets. He and his crew received death threats after being accused of causing the closure of the Revillagigedo Islands to fishing in 2002.



This majestic

California Gray Whale is severely tangled in gill nets

He's not deterred. "I'm passionate about anything that is so unjust that it is taking the future away from all Mexicans. It drives me nuts," he says. "Officials are the ones destroying the sea, it is not the fishermen or even illegal fishermen."

Predatory Fishing Practices

Now 74, McGettigan has the tall, taut build of a lifelong waterman and the public relations savvy of an expert in mass communications. Working with Armando Figaredo, the on-air representative for Mexico's influential Televisa radio and TV network, SeaWatch has produced more than 150 three-to-five minute-long television segments that have aired around the world. McGettigan has teamed with the Mexican Navy, and ProNatura, another non-governmental conservation group, to spearhead a team that is building artificial reefs by identifying, thoroughly cleaning and sinking surplus ships that create havens for fish to hide and breed. He writes articles and has been written about in the *Los Angeles Times*, the *Western Outdoor News*, and other influential media. He has reached out to form partnerships with conservationists, non-governmental organizations (NGO's) sports fishermen, researchers, as well as both honest and illegal fishermen across the Sea of Cortez. He's amassed thousands of hours of video and tens of thousands of photographs documenting nearly every activity that takes place in his beloved Sea. "Fisheries in the Sea of Cortez can only recover if there are clear regulations designed to stop predatory fishing practices," McGettigan says. "We need both vigilance and even-handed law enforcement that will earn respect from both the fishing community and the public."



In the 1960's the abundance of fish in the Sea of Cortez seemed endless. The beautiful tails of 20 or more marlin drag on the ground behind this heavily laden pickup truck.

It all started in 1972 when McGettigan made his first trip to Baja California to buy a sailboat in San Carlos. That was one year before the 1711-kilometer (1063-mile-long) two-lane ribbon of blacktop called the Transpeninsular Highway was completely paved from Tijuana to Cabo San Lucas. Before that time, Mexico Highway 1 as it would later be numbered, served more as a barrier than a connector. Rains could wash out long stretches of the dirt road for weeks at a time. Bridges were almost nonexistent. Rancheros by the side of the road dispensed gasoline from 55-gallon drums to the occasional intrepid motorist. Hotels and restaurants were few and very, very far between. But the deserts, mountains, oases, and especially the sea teemed with life. "It was wild. I fell in love with Baja California; I fell in love with the people and with the sea," Mike recalls. "I used to dive down and look into underwater crevices and see 200 to 300 lobsters at a single glance, but at the time Mexicans didn't eat lobster." McGettigan says that he recalls a time in 1973 when a restaurant owner from Arizona flew down to San Carlos every other week. He hired a panga and four divers. "The week I was with him, he took 936 lobster tails back to Arizona. He returned two weeks later to do it all again," Mike says. "The abundance seemed endless."

In 1972, Mike and his friend Richard Kipp of Portland, Oregon, bought a 52-foot sailboat in San Carlos, Baja California Sur, called *Vagabundo*. Built by the respected Cheoy Lee boatworks in Taiwan, *Vagabundo* opened Mike's eyes to the splendor of the Sea of Cortez. McGettigan traveled, dove and fished the Sea of Cortez for twelve months. "I had this unbelievable year of what it was like to live in Baja California and experience the Sea of Cortez, and I knew that I was destined to stay here." Mike recalls one of his early dives in the Bahía Concepción, about 30 kilometers (20 miles) south of Mulegé. "I made one dive, and was surrounded by fifty or more groupers each weighing 45 kilograms (100 pounds) or more. They were absolutely fearless, he said." That first year in Baja California transformed McGettigan. Although he sailed *Vagabundo* up and down the California, Oregon and Washington coasts, his mind always drifted back to Mexico. He sailed to Hawaii where he lived for a year. But all along the way he kept thinking "why am I in Hawaii? All the life is in the Sea of Cortez."



Mike McGettigan and his partner Sherry Shaffer hang out in Alaska, enjoying some rest and relaxation

McGettigan was born in Idaho and attended grade school in Portland, Oregon. He attended the City College of Santa Barbara, where, as he puts it, “I was just trying to get my grades up to the point where I could get into a real school,” he jokes. “I was on the eight year plan, and enjoyed every minute of it.” Mike finished with a degree in business from Portland State College, graduated in 1966, and then briefly went to work as a production engineer for high-tech companies such as Tektronix and Omark Industries. As an outdoorsman, he followed in his father’s footsteps as an avid fisherman.

After a few years, he quit working for big companies. “I always knew that I wanted to be in business for myself,” he explains.” In 1967, he started a company called Stereo Superstores, and eventually grew it into a \$40 million per year business selling audio electronics and televisions to wholesalers and warehouse retailers such as Costco. McGettigan owned Stereo Superstores for 18 years. “But I was smart enough to know that I wasn’t the guy to manage the business,” he says. “So after five years, I hired talented managers to run the day-to-day operations, which allowed me to spend a lot of time in Baja California. I was hooked.” During the late 1970’s and early 1980’s McGettigan spent at least half of each year in Baja California waters. During the mid 1980’s he sold *Vagabundo* to his partner and commissioned the building of Ambar III, a 75-foot motor yacht. “I wanted to build a boat with a 3000-mile range that would let me stay on the water for extended periods of time,” he said. To date, McGettigan has logged more than 644,000 kilometers (400,000 miles) on the water, and thousands of hours underwater as a SCUBA and free-diver.

Taking Every Last Fish

McGettigan’s first encounter with “take-it-all” fishing mentality came on one of his earliest trips to Baja California. During the late 1970’s he witnessed the complete destruction of a major Pargo fishery. Pargo, also called dog tooth snapper, is a very sought-after fish. Fishermen are experts who know the habits of their catch, the tides, and which seasons bring what species of fish. Pargo always came to breed in a particular bay near Agua Verde, located about 65 kilometers (40 miles) south of Loreto. For just a few days each June, thousands of large breeding pargo came to Agua Verde. “It was amazing,” McGettigan recalls.

“The entire bay would turn red from the massive congregation of these brightly colored fish.” For many years, fishermen posted children on the hills above the bay to act as lookouts and alert their elders when the fish arrived.

For years families had caught Pargo using simple hooks and lines. But that was also about this time that monofilament gill nets and pangas with outboard motors began to arrive in some of the Agua Verde and other remote fishing camps. Fishermen figured out how to stitch together a dozen or more gill nets into a giant-sized super net. They then slowly swam the huge net across the mouth of the bay, herding fish towards the beach. “I told them they were killing their future, but they took more than 72,000 kilograms (80 tons) of pargo in one week,” Mike remembers. The Agua Verde population of breeding pargo for that year was essentially wiped out in ten days’ time. Every year after that, the children waited on the hillsides above the bay, hoping to spot the return of large breeding schools of Pargo. But after three years, the fish never returned, and neither did the children.

When the Sea Began to Perish

Then, during the 1980’s McGettigan recalls, “the Sea of Cortez began to die.” A new generation of small, fast, inexpensive fiberglass fishing boats called *pangas* had burst onto the scene. A high-cut prow enabled these open boats to slice through even the roughest seas. Each panga carried two or three monofilament gill nets. Propelled by ever-higher horsepower outboard motors, with the fastest now capable of speeds up to 80 kilometers per hour, (50 MPH) pangas greatly expanded the range of fishermen. By the mid-1980’s an estimated fifteen to twenty thousand pangas were working throughout the Sea of Cortez, as well as on the Pacific side of the Baja Peninsula.



This seal has a fishing line and part of a net wrapped around its neck. As the animal grows, it is likely to die of strangulation, asphyxiation, or starvation.

At first, fishing methods were simple. For years, fishermen used monofilament gill nets, which are made of inexpensive, long lasting non-biodegradable nylon mesh. The gill net is usually anchored to the sea bottom, or held at a certain depth in the water column by floats attached to the top of the net and weights at the bottom. In the artisanal fishing practiced by panga fishermen, gill nets are usually hauled aboard by hand; larger boats usually employ motorized winches. When faster pangas and ever-larger gill nets quickly became widespread, fishermen moved into new, previously unfished areas. The techniques were basic: fishermen simply set their nets and waited for fish to swim into the nearly invisible traps. But it wasn't only fish that swam into gill nets—they trapped everything including rays, sea lions, sharks, turtles, lobsters, whale sharks, and even migrating whales.

A huge percentage of sea life trapped in gill nets had no commercial value. One study estimated that only about 15 percent of the catch was the target species that had marketable value. The rest, termed "bycatch," was dumped overboard. If an animal such as a sea lion or turtle is fortunate enough to escape a gill net, they often were still partially entangled by the nylon mesh. As the animal grew, it often died of slow strangulation, starvation, or loss of blood supply.



This whale is severely tangled in a fishing net and may die if it can't free itself.

For example, researchers estimate that there are several dozen whale entanglements yearly in Mexico. There were 14 entanglements in 18 months in one small area. Most whales die a long torturous death from these entanglements. One whale was found alive without a tail. A piece of net rope wrapped around its tail when it was young, and had cut off the circulation as the animal grew.

In addition to the large fish catches snared by the panga fleet, a huge part of the destruction in the Sea of Cortez and the Pacific Ocean side of Baja comes from shrimp trawlers. According to Mexican law, shrimp boats are prohibited from trawling in the bays of Baja California. "Yet when the shrimp are running, boats that pay for permits. Magdalena Bay (at about mid-peninsula on the Pacific side) is supposedly closed to trawling, but more than 800 pangas have permits. How can that be?" McGettigan asks.

Using nets weighted with heavy chains, the trawlers scrape the floor of any seabed shallower than about 90 meters (300 feet), dredging the bottom year after year in a maritime version of clear cutting. Conapesca, the Mexican fishing authority, does issue permits for special wheeled nets called *chongas* that roll over the sea bed instead of dredging the bottom with heavy chain, but in practice they are almost never used. For every kilogram of shrimp caught, trawlers kill as much as 20 kilograms of bycatch.



Five of the seven species of the world's sea turtles live, visit, or feed in the Sea of Cortez. Sea turtles trapped in fishing nets are often part of a fisherman's "by catch."

The wild shrimp fishery in the northern Sea of Cortez has virtually collapsed in the past several decades, and the five species of sea turtles that used to call this area home are all severely threatened.

Fast-Shooting Nighttime Gunmen

During the early 1990's McGettigan began to observe fishermen using two new methods to scrub the sea of all life not already captured by gill nets. The evidence for the loss of fish life was alarming. In a healthy reef, fish take care of housekeeping by nibbling away at algae. But during this time, McGettigan began to notice that reefs were beginning to lose all of their colorful hard and soft corals, turning instead into barren algae-covered rock. Both new methods of fishing were based on the hookah system, which appeared in



On this boat you can see the hookah gear illegal divers use. It's a small motor that runs an air compressor. The machine feeds air to a diver through a long tube allowing him to stay underwater indefinitely, often at unsafe depths

about 1988. A hookah consists of a small gasoline-powered motor that sits aboard the panga. The hookah motor drives a compressor to deliver a virtually unlimited supply of air to the diver through a long rubber hose. Working at night, using hookahs and powerful underwater lights, teams of three divers could descend as much as 45 meters (145 feet), and shoot cabrilla, grouper and parrot fish. The fishermen who use this method are called *pistoleros*, or gunmen. There are two types of *pistolas*. The first is a simple, often homemade device usually constructed of a three to five-foot-long piece plastic tubing with three sharpened metal tips. Power is provided by a section of rubber (such as surgical tubing) attached to the pole. This type of device is also commonly called a Hawaiian sling. *Pistoleros* also use commercially available spear guns, which are more powerful and have a longer range than the Hawaiian sling.



Look carefully at the head of this fish. The telltale hole in the center of the head just behind the eyes means it has been shot by a spearfisherman.

With a *pistola* in hand, a diver can shoot and reload in seconds. Divers scour the deepest nooks of rocky reefs and often shoot fish while they are asleep. A diver who uses a commercially available spear gun often trails a long nylon line behind him. Once the fish has been harpooned, the diver simply slides the fish down the nylon line as if he were stringing beads on a necklace. When using Hawaiian slings, one diver shoots the unsuspecting fish, and then loads it, still wriggling, into his partner's mesh bag. With either method, a skilled *pistolero* usually tries to shoot the fish in the head because the shot is more lethal. Also, when it is filleted, consumers pay less for a fish with three spear-point holes in the flesh. (If you shop for whole fish in a Baja California market, check for the telltale puncture. It is almost certain



Using powerful lights, these pistoleros (spear fishermen) average take was more than one ton of fish per night

that this fish was speared illegally). With these new methods, the first divers to adopt these methods could take as much as take 1200 to 1500 kilos (2650 to 3300 pounds) of fish per panga per night. What started as seven full-time pangas has now grown to about 40 full-time and 60 part-time pangas. Anecdotal evidence of the *pistolero*'s nocturnal lethality abounds. In their first year, two brothers working as *pistoleros* took more than 45,000 kilograms (50 tons) of fish in the waters off La Paz. Depending on time of year, 30 to 40 percent of the fish in local markets comes from *pistoleros*. In addition to local consumption, fish and lobster are also shipped each week to markets in mainland Mexico. Because of the scale of the slaughter, the fleet of nightly *pistolero* pangas now are only able to get about 150 to 200 kilos (330 to 440 pounds) per night. Yet even today, this illegal method is spreading in popularity, especially to the Pacific side of the Baja Peninsula.



Attorney Maria Ugarte working with fishermen she represents

Starting in 2007, McGettigan and SeaWatch attorney Maria Ugarte began a campaign to write into Mexican law books new fishing legislation that makes it illegal to use of hookah equipment for spear fishing. The new law also made it illegal to place nets on rocky reefs, or anywhere there is a coral reef. Despite being outlawed by the Mexican government in June 2009, the practices of illegal netting and nighttime spearfishing using hookah equipment continue.

Rounding Up Fish Like Cattle

With the second new method of fishing teams of hookah-using divers swim into pockets of reef and use iron bars to bang on the rocks to disorient the fish, allowing them to be easily herded into pre-strung gill nets. Fishermen no longer have to wait for a newly set net to fill up; they simply rounded-up fish



Encerradores , or “encirclers” work as a team. Underwater, divers using hookah gear drive fish into nets. The fish are then hauled aboard the boat by their team mates.

as if they were cattle. These fishermen are known as *encerradores*, which literally means ‘encirclers.’ In the early days of hookah diving these boats could also take up to 1000 kilograms (2200 pounds) of fish per day. As reef fish populations decreased, divers with hookah systems began to vacuum the reefs of every living organism: fish, lobsters, sea cucumbers, shells and snails—anything that could garner a *peso*. In the last eight years, reef fish have been severely reduced in number throughout the Baja California Sur coastline from La Paz in the south, up to—and including—the Loreto Bay National Marine Park in the Sea of Cortez, a distance of approximately 240 kilometers (150 miles). The destruction is most shocking in the Loreto Bay National Marine Park, which was created by a presidential decree in 1996.



No more waiting for fish to swim into nets on their own. Hookah-using fishermen use iron bars to bang on rocks. The noise scares the fish and drives them into pre-strung nets

The park covers 2065 square kilometers (about 800 square miles) in the Sea of Cortez. In 2005, the park was added to the United Nations list of World Protected sites. Most large-scale seiner fishing has been successfully curtailed in the park. However, artisanal fishing is still permitted in 99 percent of the Reserve. Only about one percent of the Reserve is designated as a “no-take” area that is completely off limits to fishing.

Lethal to Fish, Deadly for Divers

Hookah diving is lethal to fish, and also often deadly for fishermen. A hookah system consists of six basic components: a motor, an air compressor, a filter, a reserve air tank, plastic breathing tube, and an air regulator that delivers a constant air pressure to the diver through a mouthpiece. Early generation hookah compressors were lubricated using mineral oil. Every 15 days a diver needed to clean the equipment and change the mineral oil. If a diver failed to clean his equipment regularly, the hookah would begin to deliver contaminated air, which



Deadly air: These spear fishermen are using an ancient hookah machine. It's visible on deck in front of the three men. Unless they are maintained regularly, old hookah gear such as this will deliver toxic air to divers

caused the diver to suffer a potentially life-threatening form of underwater intoxication. Prolonged use of hookah equipment carries other risks, as well. Unlike SCUBA, there are no heavy tanks or expensive dive vests to buy or rent, and divers can stay underwater for a virtually unlimited amount of time. (A SCUBA tank full of air lasts about an hour). There also are no training requirements, either in the US or in Baja California. Anyone with access to a hookah rig—the equipment gets its name from the multiple hoses that run from the compressor—can immediately start diving, regardless of whether they have any experience or training on how to deal with the dangers inherent to diving. Diving with a hookah carries the same risks as SCUBA diving, such as getting an air embolism or decompression sickness, according to the National Association of Underwater Instructors, (NAUI) which certifies SCUBA divers. An air embolism happens when a diver rises to the surface without exhaling and air expands in the lungs. It can be fatal, and it doesn't matter if the air came from a SCUBA tank or hookah rig.

Accurate statistics on accident and death rates among Baja California hookah divers are difficult to locate. (As a point of reference, there are an average of 10 to 15 hookah-related diving deaths per year in Florida alone). All along the Baja California peninsula anecdotal stories abound. Fishermen sometimes dive while drunk. Some use methamphetamines or other drugs to keep themselves jacked-up for all-night fishing sessions. Hookah equipment is used worldwide. The most comprehensive information about hookah accidents and fatalities comes from research among global fishing communities outside of Mexico.

Researchers who have sampled non-Mexican hookah-using populations around the world estimate that one-half of the world's hookah divers suffer diving-induced brain injuries.

Fishermen are five times more likely than recreational divers to exceed maximum allowable times at a given depth, which may lead to a buildup of nitrogen in the blood, causing a painful condition divers call "the bends," which may cause paralysis or death. In La Paz it is not uncommon to see men with torturously twisted hands, arms or legs. More often than not, they are divers who were victims of the bends. Divers from La Paz say these accidents are more commonplace in San Carlos and other Pacific-side fishing towns on the peninsula.

Divers face other dangers as well—sometimes from their own crewmembers. La Paz hookah diver Daniel Mendez was one of the lucky ones. He and his team were diving when a Mexican patrol boat approached their panga. Rather than risk arrest and fines, his boatmen cut Daniel's plastic air tube and sped away, only to return later to see if the diver survived, or to pick up a floating body. Daniel survived by swimming to a nearby reef.

Long-Lining for the Fish of Gold

It's 3 AM on a muggy June morning in the seaside city of Guaymas on the mainland side of the Sea of Cortez. In the pre-dawn darkness, teenage brothers Jose Luis and Edgar Ceseña Calderón are preparing their 26-foot-long panga for a marathon fishing session. Their target is one of the most beautiful, hardest-fighting, mouth-watering fish in the world. By any measure, *Coryphaena hippurus* are magnificent creatures. Found in tropical and subtropical waters around the world, the fish are known by several different names, which sometimes causes confusion. In the Hawaiian language, and on many menus, the fish are called *mahi-mahi*, meaning “very strong



Long-liner fishermen working from small open boats can take hundreds of Dorado per day

fish.” In Mexico and many Spanish-speaking parts of the world, the fish are known as Dorado, meaning “golden,” which is my favorite name. Dorados have dazzling golden colors running the length of the body on both sides of their bodies, and, while they’re alive, bright blues and greens on the sides and back. In English, Dorados are often called dolphin fish, although they bear no relation to the air-breathing mammals called dolphins. (“Flipper of the American TV series of the same name is among the best-known examples of that genus.) The person responsible for the confusion was privateer Sir Francis Drake’s chaplain who caught one in 1578. Unable to find a name for the beauty he held in his hands, he called it a “dolphin.’ With their long, slender bodies, Dorado are hard-fighting, flashy fish capable of incredible bursts of speed and have been clocked up to 92.6 km/hr. (57.5 miles per hour).



This beautiful Dorado, the “fish of gold,” has been hooked by an illegal long-liner fisherman

Everything aboard the Calderón brothers’ panga is arranged for maximum efficiency. Two-hundred-and-thirty kilograms (500 pounds) of shaved ice are packed into three different holds aboard the boat. Hundreds of barbed steel fishhooks dangle neatly from the gunwales, along with one-liter plastic milk jugs that will serve as floats to mark the hooks once they are in the water. Coiled on the foredeck is about *10 kilometers (6 miles)* of pinky-finger-thick polypropylene line and a rusty anchor. The Calderón brothers are long-lining for Dorado. During June, July and August, the blistering summer season when Dorado are biting on the Sea of Cortez, the brothers will work nonstop for up to 22 hours per day. “It’s terrible work, and I hated it,” said Edgar Calderón. “Sometimes I wouldn’t see my family for days or weeks at a time.”

High Earnings Drive Illegal Fishing

Leaving from Guaymas, it takes the brothers more than two hours of blasting through the chop to reach to reach their fishing grounds off Baja California’s San Marcos Island. In a well-choreographed deadly ballet, they set the anchor and immediately begin feeding out the polypro line. Every three meters (10 feet) they clip a baited hook and a plastic float bottle onto a four-foot-long leader. Motoring slowly, it takes more than four hours to set the entire six miles of line.

Now the hard, bloody work begins. Reversing course, the brothers begin to reel in the polypro line. A sharp knife flashes as each fish is bled out and tossed into the hold. A layer of fish, a layer of ice. Repeat. Re-set the hook on the gunwale, bring in the float. As they die in the hold, the Dorados quickly lose their rainbow colors and the skin fades of a lifeless gray. By the brothers’ count, many hooks contain a Dorado; a few are empty. The rest of the catch is considered “worthless.” There are seabirds, sharks, rays, turtles, perhaps an occasional juvenile marlin.

When the Calderón brothers first began long-lining for Dorado, a good day’s catch could bring in as much as 2180 kilograms (4,800 pounds) of illegal fish. As with most fishermen in Mexico, the Calderón brothers don’t own their own panga and motor. Instead, the boats generally belong to a middleman, who is also usually the buyer for the catch. After paying for gas, ice, equipment and rental of the panga, each brother once earned up to US \$600 *per day* for his work. Included in the middleman’s cut is money to pay for the fishermen’s share of a bribe to local authorities. That’s a lot of money. For comparison, on January 1, 2014, the Mexican government set a new minimum wage standard for the country of about US \$5 per day.

In three days of successful Dorado fishing, the Calderóns earned far more than the entire year’s salary of a Mexican laborer.

Edgar, now 42 and Jose Luis, 38, gave up long-lining when the Dorado population became so depleted that it was no longer profitable to fish. “During the height of the Guaymas-based fishery, about 700 pangas were bringing more than 80 tons of Dorado per day to the port located next to the Navy base,” McGettigan says. “Five years of illegal fishing had decimated the Dorado fishery in the Sea of Cortez”.

Flying Through the Sea in “The Galapagos of Mexico”

Thirty years ago the Revillagigedo Islands were one of the richest archipelagos in the Eastern Pacific. Located about 400 kilometers (250 miles) south of the tip of Cabo San Lucas, this tiny cluster of volcanic cindercones was world-famous for its abundance of apex predators such as hammerhead sharks, giant pacific manta rays and yellowfin tuna. The Revillagigedo Islands are small—a total of only 158 square kilometers (61 square miles) spread over an east-to-west extent of about 420 km (261 miles). They are so rich in plant, animal, fish and bird life that they have been called the “Galapagos of Mexico.”



Teeming with sea life, the Revillagigedo Islands off the southern tip of Baja California is a popular diving destination

Mike McGettigan and Sherry Shaffer, his partner of 32 years, have made more than 130 trips to the Revillagigedo Islands and were some of the first people to dive there extensively. “When I first got to the islands in 1978, we would often be surrounded by several hundred sharks,” Mike says. “While underwater, we would see up to 100 wahoo at a time and often spend 45 minutes watching the same school of tuna swimming past us. The schools would be miles long.”

During a trip to San Benedicto Island in the Revillagigedo chain in mid-February, 1994, Mike, Sherry, and several guests aboard Ambar III had the pleasure of SCUBA and free-diving with manta rays. Weighing up to 1400 kilograms (3000 pounds) or more, with a 7-meter (22-foot) wide “wingspan,” these gentle giants appear to effortlessly fly through the crystalline sea. “In the mid-1980’s when we first swam with the mantas they seemed a bit shy,” Sherry recalls. “Then I swam underneath one of the mantas and gently rubbed its white underbelly,” Sherry said. * “At first it was a bit eerie to swim below such an enormous creature.” *Manta* means “blanket” in Spanish, which is an apt description of the shape of this enormous ray. Sherry, a highly experienced free diver, is capable of holding her breath for three minutes or longer and descending to depths of 30 meters (100 feet) or more.

**Note: When the first divers began swimming with the mantas, there was no code of conduct in place governing interactions with the animals. Today, because swimming with mantas has become so popular, divers are forbidden from riding mantas or approaching closer than 3 meters (10 feet). For a link to the complete diver code of conduct, see the appendix for this chapter. Although this code of conduct is written with specific reference to mantas, I believe it is a good guideline for interacting with whale sharks, sea lions, or any form of marine life.*

Dancing with Manta Rays

What happened next astonished everyone. The manta sped away from the divers and returned a few minutes later with other gentle giants. For the next several hours divers and four to eight mantas played together in the warm seas. A manta would circle past a diver, and seemed to delight as the human gently grabbed hold of the ray to hitch ride along on its back.



Free diver

Sherry Shaffer swims with a huge manta ray in crystalline water

“The mantas seemed to enjoy playing with us as much as we loved playing with them,” Sherry recalls. “It’s a magical experience when this fish that seems straight out of a myth is turning in patterns with you, engaging with you, and – like any good dance partner, making direct fish-to-human eye contact.”

The St. Valentine’s Day Massacre

At 9:00 a.m. on February 14th, 1994 the Unicap III, a Mexican fishing boat, started pulling in their nets off the south end of San Benedicto Island. Passengers aboard McGettigan’s boat, the Ambar III, watched helplessly as two of the mantas they had been riding the day before became hopelessly tangled in the nets. These gentle giants had fought the nets and been torn to pieces. Because of the damage to the nets, and to the mantas, the



The Unicap III, a Mexican fishing boat, netted this huge manta, cut the wings from the still-living creature, and dumped the net and dying ray overboard

Unicap III crew decided to cut their nets loose and throw them back in the water – entangled mantas, nets and all. When the Unicap III departed, there were thousands of feet of invisible monofilament net all over the reef that would continue to trap and kill fish for years. When they pulled in their long lines, there was nothing but sharks on the hooks. As the sharks came up over the back of the boat, the undesirable ones were cut loose or finned, the lines were cut off above the hook and the hook and the animals were dropped back into the water, where they immediately sank to the bottom. The underwater reef was littered with dying sharks, some still trying to swim without fins or a tail. At that time, fishermen were selective as to which sharks could be sold for meat, and which sharks had their fins cut off while still alive, then dropped overboard to die a slow death. The fins would later be dried and sold to make shark fin soup.

In the meantime, another fishing boat, Mero VII, was busy harpooning the first manta that passed by their boat. The twenty-foot, one-ton manta was gaffed with large hooks, and lifted out of the water, still very much alive, alongside the boat. Then the men got out in a small boat and proceeded to use axes to cut the wings from the manta. Except for a pair of cruelly harvested manta wings and a few shark fins, the two boats had nothing to show for that destruction. But during the carnage, McGettigan and his crew videotaped the entire scene of the



The wings of these giant manta rays were chopped off the still-living animal to be sold for their meat. The rest of the ray was dumped overboard.

manta being lifted out of the water and hacked to pieces. The audio portion of the tape is perhaps the most gut-wrenching. In it, you hear a woman aboard a boat near Ambar III screaming and sobbing hysterically begging the fishermen to stop.

Within days SeaWatch brought this senseless slaughter the attention of the public. Television news stations from as far away as German and Japan ran the tape. The news was run three times on Guillermo Ortega's influential Mexican TV news-magazine, *Al Despartar*, (Wake Up!) which is seen by 58 million Latinos. With the help of freelance reporter Armando Figaredo, SeaWatch made nine more Sea of Cortez specials for *Al Despartar*. In the US, the manta slaughter was part of the national CBS Evening News in August and it became international news on CNN the same month.

Reaction was swift. Miguel Sanchez-Navarro and Mauricio Ruiz, President of ProNatura, the largest private Mexican ecology foundation, took the video of the killing of the Mantas directly to Mexican President Salinas Gotari and the Head of Fisheries. Within a few months, the Giant Pacific Manta was put on the endangered species list. It is now a crime to kill one in the Revillagigedo Islands, punishable with a \$10,000 fine. This incident and its worldwide condemnation was also a catalyst for the President declaring the creation of the Revillagigedo Archipelago World Biosphere Preserve in 1994.

Closing the Islands to Fishing

Eight years of effort after the 1994 St. Valentine's Day Massacre came to a successful conclusion in March of 2002. SeaWatch and Miguel Sanchez-Navarro invited Secretary Santiago Creel, the minister in charge of the islands, to witness first hand the damage being done by illegal long-liners and drift gill-netters. As a result of this trip and a lawsuit filed the year before by Luis Bulness, the Dive Boat *Solmar* and the Hotel and Sports Fishing Association of Cabo San Lucas, the entire biosphere was closed to all fishing as of March 2002. This closure also included sports fishing. Though these boats had only a small environmental impact on the reserve, they provided an informal surveillance network that has now disappeared. Unfortunately, there are a few sports fishermen who choose to flout the law. When protective patrols and vigilance in the Biosphere were decreased after 2010, some long-range boats from Cabo San Lucas and Puerto Vallarta have been sneaking in to fish illegally. Meanwhile the large commercial operators have largely chosen to ignore the law. Tuna seiners and long-liners routinely fish illegally inside the Biosphere.

Today, on the three inner islands of Socorro, Benedicto and Roca Partida wahoo populations have been devastated. Mature wahoo can weigh up to 45 kilograms (100 pounds) and are much prized for fishermen for their incredible fighting abilities. Today the weight of the average fish caught is one-fifth that size; populations have been reduced by 70 to 80 percent since the 1970s. The biggest wahoo decreases have come in the last five years due to pressure from sport fishing. Shark populations have decreased by 50 to 60 percent. Many remaining sharks have mouth injuries from hooks and are trailing long fishing lines. Yellowfin tuna populations have also dramatically declined over the past 20 years. Tuna seiners scour the waters in and around the biosphere, as well as the oceans just south of the Revillagigedo Islands. Sport fishing has also heavily impacted reef fish such as the Blue Jack, Rainbow Runners and Leather Bass with populations reduced by 30 to 40 percent. Uncontrolled commercial, and to a lesser degree sport fishing, is the primary cause of these tragedies. These islands, as fragile and diverse as the Galapagos Islands, can be greatly impacted for years by a single long-liner. Today, long-liners operate without penalty in the Revillagigedo Islands.

“The Revillagigedo Islands Biosphere remains a park on paper only,” McGettigan says. “These islands will never equal the touristic draw of the Galapagos, but if they are managed carefully they could be the one place in all Mexico that is a breeding ground for tuna and wahoo that could be brought back to pre-industrial fishing levels.”

Unlike many parts of the world’s oceans, the Revillagigedo Islands fall entirely within the territorial limits of one country. “There is no need for an international cooperation or legal framework to protect them,” McGettigan says. All that is needed is the political will to enforce the laws already on the books.”

Fish Orgies and Ocean Hope Spots

Many species of fish in the Sea of Cortez, and elsewhere in the world reproduce by what scientists call spawning aggregations. The locations of many of these “hope spots” are well known. “A more descriptive term might be *fish orgies*,” writes Tim Folger in an article entitled “Saving the Wonders of the Sea of Cortez” in an article in *On Earth Magazine*. “Tens of thousands of fish might swim for hundreds of miles in dense, swirling eddies of courtship and sex, releasing clouds of eggs and sperm.”

There are ten species that are the most important for small-scale fishermen in Baja California Sur, and eight of them presumably enjoy their fish orgies. Fishermen pull in about 60 percent of their catch of these eight species for the entire year during a brief three-month window when fish are aggregating. “Most of the spawning sites are known,” writes author Tim Folger. “The first priority should be the protection of these sites. If we made spawning aggregations part of marine preserves, the scenario in the Sea of Cortez would be completely different.”

One Last Check, and We Turn for Home

At sunrise, Beto turns our panga back toward the Marina de la Paz. We’re exhausted from squinting through night vision binoculars for hours, ears straining to hear outboard motors and hookah gear. It’s time to call it a night. But to my surprise, Beto speeds past the Marina towards the upper reaches of the Bay of La Paz. “We’re going to check for fishermen illegally hunting for shellfish,” he tells me. We glide towards the shallows, past the rotting hulls of boats that have either been abandoned, or torn loose from their anchorages during storms. It’s nine in the morning, and the sun is already scorching. As it does on most nights, our search during this evening turned up no illegal fishermen, but that doesn’t deter Beto.

“We’ll go out again in another day or two,” he tells me. “You’re welcome to join us anytime.”

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Get Involved: Help Save the Sea of Cortez

Many groups in Baja California are involved in legislative reform, habitat preservation, stopping illegal fishing, and educating fishermen and the public. If you'd like to get involved, here's a list of just a few nonprofit agencies that have excellent, long-running programs in place:

SeaWatch

<http://seawatch.org/en>

Niparaja (site is in English and Spanish)

<http://www.niparaja.org/index.html>

Noroeste Sustentable (Site is in Spanish, but translates nicely if you hit "translate this page in Google).

http://www.nos.org.mx/wp/?page_id=164

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