

Harvesting the Sea of Cortez,

from Kino's Era to Modern Times



photography by **Richard C. Brusca**
unless otherwise noted

A LONG HISTORY OF OVER-FISHING THE SEA OF CORTEZ

Once upon a time, there seemed to be an inexhaustible supply of seafood in the Sea of Cortez. Indeed, the Gulf of California has long harbored some of the most productive fisheries on Earth. People have been drawing sustenance from those waters for 10,000 years or more — Native Americans, Kino-era Spanish colonists, later European pioneers, and modern-day North Americans. Today, over half of Mexico's total fisheries catch comes from the Gulf of California. When human numbers in the region were low, fishing had little impact on the Gulf's environment. However, it didn't take long after the arrival of the Spaniards for over-fishing to begin taking its toll.

Richard C. Brusca, Ph.D.

Executive Program Director, Arizona-Sonora Desert Museum

left: Shark fishers, Island of Partida

lower left: Red snapper (Lutjanus sp.)

lower middle: Shrimp boat bycatch

below: Giant sea bass (Stereolepis gigas). Six-foot long adults like this have become very rare in the Gulf of California, due to over-fishing by both sport and commercial fishers.

right: The historical importance of shrimp fishing in the Sea of Cortez is exemplified by this stunning monument to shrimp fishers in Puerto Peñasco, in the northern Gulf.





Photo by Francisco Barco de Leon

NUEVA NAVARRA
 regis sus relictamentis olim Reynas
 1710
 YUMAS

The first written records of over-fishing in the Sea of Cortez come from Miguel del Barco (1706-1790). As a Spanish missionary to the New World, del Barco oversaw what is now regarded as the finest mission built on the Baja California peninsula (and perhaps also in the Pimería Alta), 30 miles west of Loreto — Mission St. Francis Xavier. Among Miguel del Barco's natural history writings is a detailed chronicle of pearl-fishing in the Sea of Cortez that describes the rise and fall of the industry, as the oysters were systematically decimated throughout the lower Gulf of California. Del Barco also noted that the Natives of southern Baja California (and mainland Sonora) collected pearls long before the Spaniards arrived. By the early 1700s the Seri were harvesting pearls commercially from the Canal del Infiernillo (between Tiburón Island and the mainland) from the so-called San Xavier or Tepoca placers by free diving, often with hand-woven nets, to depths of nearly 100 feet to collect winged pearl oysters (*Pteria sterna*), and to a lesser extent, black-lipped pearl oysters (*Pinctada mazatlanica*).

It was the abundance of pearls that made Lower California famous in Europe in Cortés' day, and for almost two centuries it was the principal natural resource that drew European explorers to the Baja California peninsula. Some ardent entrepreneurs even paddled canoes across the Gulf from Sonora to extract pearl oysters from the peninsula's waters. There were attempts to establish permanent pearl fisheries there, including those of the seventeenth century led by Nicolás de Cardona, Juan de Iturbe, Francisco de Ortega, and others. Constant pressure by Spaniards on the pearl oysters over two centuries greatly diminished their abundance.

top left: Creolefish (*Paranthis colonus*), with a school of scissortail chromis (*Chromis atrilobata*) in the background. Cabo San Lucas, Baja California Sur.

left: Pearl oyster lagoon built by Gastón Vives, Bahía San Gabriel, Espíritu Santo Island, in the southern Gulf.

far lower left: Shell middens (prehistoric dining sites), like this one in the northern Gulf of California, attest to the variety of shellfish consumed by native peoples in the region. About 35 mollusc species have been found in northern Gulf shell middens.

lower left: A sportfishing boat's catch of Gulf grouper (*Mycteroperca jordani*), on a beach in the northern Gulf. This species, listed as endangered by the The World Conservation Union (IUCN), is heavily over-fished.



Photo by Ben Ruppnow

In the late 1800s/early 1900s, after pearl oysters had become scarce, there was a short-lived attempt to build a pearl aquaculture facility in Bahía San Gabriel, on Espíritu Santo Island, off La Paz. The architect of the scheme, Don Gastón Vivés, moved workers to the island to construct a system of canals and dikes out of thousands of tons of hand-hewn rocks. The remains of that experiment still stand, overgrown by mangroves, as testimony to the seduction of pearls in the Sea of Cortez. And, of course, one of the greatest stories ever told of the siren-like lure of these pearls is John Steinbeck's famous novel, *The Pearl*.

The Situation Today

Today, pearl oysters are sparse in the Sea of Cortez. Pearl oysters were the first marine species to be over-harvested in the Gulf, but many more species of shellfish and finfish have followed suit. In historic times, traditionally captured finfish — mainly large predatory fishes at the top of the food chain such as sea basses, groupers, corvinas, snappers, sharks — were harvested with no concerns for sustainability, as if their abundance could never be depleted. Just 40 years ago, this was still the assumption. But no longer—not in the Sea of Cortez nor anywhere else in the world. *In the Gulf, as in all the world's oceans, up to 90 percent of the predatory fishes have disappeared due to over-fishing.* In fact, all of the traditionally fished species from the Sea of Cortez have been over-harvested to the point of

top right: Pacific green turtle, *Chelonia mydas agassizii*

right: Shark fins for sale in Chinatown, San Francisco, in 2007 (probably blacktip shark).

As the prices on these jars reveal, a strong market persists for dried fins, leading to the practice of "finning," in which captured sharks have their fins removed and are then thrown overboard to die a slow death. Due to increased environmental awareness, shark finning has largely ceased in the Gulf of California, but it continues in many places in the world.

lower right: A goliath grouper (*Epinephelus itajara*) from the Gulf of California; probably an accidental catch in a shrimp net. Goliath groupers rarely reach this size today.

far lower right: Gulf corvina (*Cynoscion othonopterus*) populations fluctuate wildly in the Gulf of California, due to fishing pressure and environmental conditions. In past years, population levels of this species have fallen so low that their commercial fishery collapsed.



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Photo by Juan Carlos Barrera

Photo by José Campoy



Courtesy of J. Saminoff.

Photo from 1937 showing the abundance of now nearly extinct totoaba, endemic to the northern Gulf.

collapse of their commercial stocks. Populations of traditionally fished species, the large predatory fishes, are now a mere shadow of what they were just four decades ago — likely less than a tenth what they were historically.

Coincidental with depletion of the species is environmental damage. One of the worst fishing practices is shrimp trawling. Most wild shrimp are bottom-trawled, or “dragged” with nets on heavy equipment that levels the seafloor and kills everything in its path. Bottom-trawling is the undersea equivalent of clear-cutting forests.

For every kilogram of wild shrimp trawled, up to 20-40 kilos of additional bycatch, the aggregate nontarget species caught, is destroyed and discarded! Globally, shrimp trawlers produce less than two percent of the world’s seafood by weight, but are responsible for one-third of the world’s bycatch. They also kill an estimated 150,000 endangered sea turtles worldwide annually, as the turtles are dragged in the nets until they drown. Shrimp trawlers kill more sea turtles than all other causes combined. Commercial shrimp fishing is the most inefficient and destructive fishing technology on Earth. Data and anecdotal observations suggest that the structure of the sea floor community has changed dramatically in the Sea of Cortez over the past 40 years as a result of this relentlessly destructive activity.

During the mid-1990s, shrimp farming developed explosively on the coast of the Gulf, driving down the wholesale price of shrimp and finally making industrial shrimp fishing unprofitable without heavy government subsidies. However, with virtually no regulation on these coastal shrimp farms, they are degrading or destroying coastal lagoons and near-shore habitats at a rapid pace.

The waters of the Gulf are subjected to pressures not only from industrial and artisanal (family operations) fishing, but also from sport fishing by American tourists. The sport-fishing industry also targets predatory fishes that top the food chain — pelagic species (of the open waters) such as billfishes, tunas, dorado or dolfinfish, and yellowtail, as well as rocky-bottom fishes such as groupers and snappers. Sport fishing competes with commercial fishing for diminishing stocks, creating tension between commercial Mexican fishers and American tourists and their guides. Such tensions have boiled over into strikes, roadblocks, and even skirmishes in some beach towns that tourists frequent. And, while catch-and-release fishing practices are an improvement, large barbless hooks cause substantial damage to fish and commonly lead to their death after release.

The extraction of predatory fish from the sea profoundly alters coastal and oceanic food webs. We now know (from studies in other ocean areas) that these food webs can be forever altered when top-of-the-food-chain carnivores are removed, never returning to their original state even after fishing is banned.

The miniature *vaquita* porpoise has been one of the indirect casualties of over-fishing. These rare marine mammals, the smallest cetaceans on Earth, live only in the uppermost reaches of the northern Gulf, near the delta of the Colorado River. With the most recent estimate of vaquita abundance at fewer than 250 individuals, and mortality estimated at 10 percent per year, the vaquita is the most endangered marine cetacean in the world. The primary cause of vaquita mortality is incidental capture in fishermen’s gillnets. There is a high probability of extinction for this species in the coming decade.

An Optimistic Future

Despite these dire straits, there is reason for optimism. The rise of the conservation movement in northwestern Mexico over the past 20 years has led to increased pressure on federal agencies to better manage Mexico's fisheries. As a result of the steady, coordinated efforts of a few dozen environmental nonprofits (and some forward-looking government employees), significant steps have been made to protect the Sea of Cortez for the future.

Perhaps the most important step was the declaration of the Upper Gulf of California and Colorado River Delta Biosphere Reserve in 1993. The establishment of this reserve brought attention to the region and forced people to begin taking its conservation seriously. Since then, hard work and steady lobbying has resulted in 16 additional protected areas in Lower California and the Sea of Cortez. (The first protected area in the Sea of Cortez, Isla Rasa, was declared in 1964 largely through efforts by the Desert Museum!) Recently, U.N.-UNESCO declared all of these Gulf protected areas a World Heritage Site.

Finally, as seafood consumers, we now have a wealth of sources that inform us about sustainable choices. A plethora of information is available on the Web, including excellent sites by Seafood Choices Alliance (seafoodchoices.com), Oceans Alive (oceansalive.org), Earth Trust (earthtrust.org), Environmental Defense Fund (environmentaldefense.org or Google "Business Guide to Sustainable Seafood"), Monterey Bay Aquarium Seafood Watch Program (mbayaq.org/cr/cr_seafoodwatch, with guides in both Spanish and English), and Arizona-Sonora Desert Museum (desertmuseum.org/center/seafood.php).

In 2006, the Monterey Bay Aquarium partnered with the Arizona-Sonora Desert Museum and the Sonoran Sea Aquarium to produce a convenient Gulf of California Seafood Watch card that consumers can carry in their wallet. Seafoods are assigned to three categories (Best Choices, Good Alternatives, Avoid) based on detailed research available on the Seafood Watch Program web site. In 2007, the suite of Seafood Watch cards expanded to become a "Southwest" seafood guide. The pocket guide is available at the Desert Museum or on our website:



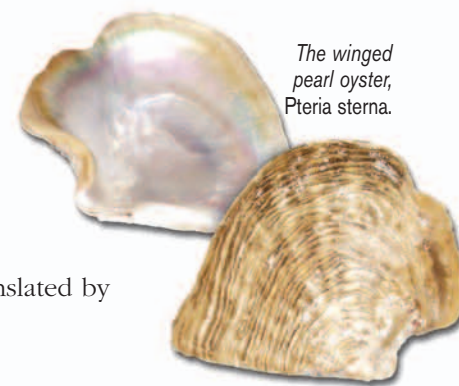
Gulf grouper (*Myctoperca jordani*) with king angelfish (*Holacanthus passer*). Loreto, Baja California Sur.

www.desertmuseum.org/center/seaofcortez. The Desert Museum leads ongoing educational efforts in the Southwest, working with individuals, restaurateurs, and suppliers to inform and encourage people to buy and consume only sustainably harvested seafoods.

There are many reasons to be encouraged about the future of the Gulf of California. New protected areas, improved fisheries management, a rapidly growing sustainable seafood movement, and better information are increasing protection for this extraordinary but threatened sea. If current conservation trends continue, and with your help, we will see the day when the diverse ecosystems seen by Father Kino return to the Sea of Cortez. **S**

Suggested Reading

del Barco, Miguel. "The Natural History of Baja California." Being part I of: *Historia Natural y Crónica de la Antigua California (Adiciones y Correcciones a la Noticia de Miguel Venegas)*, unpublished manuscript, ca. 1775. Translated by Froylán Tiscareño. Dawson's Book Shop, Los Angeles, 1973 (Spanish), 1980 (English).



The winged pearl oyster, *Pteria sterna*.