

## *Commercial Diving and the Callo de Hacha Fishery in Seri Territory*

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This paper examines commercial diving in Seri territory, from its early stages to contemporary practices. Commercial diving in Seriland is not only a story of marine-resource exploitation; it is also a tale of close interaction between two historically antagonistic sociocultural groups. From the times of the pearl hunters (1720–1733) to the present *callo de hacha* (scallop) fishery, Seri and Mexican *mestizo* fishermen have repeatedly conflicted and cooperated in their efforts to harvest marine bivalves. Grasping the nature of such interactions is crucial for understanding how the fishery began, how it has changed over time, and how it is organized today.

The Seri, or Comcaác, are a group of seafaring hunter-gatherers who, before becoming sedentary, were organized in seminomadic bands (Moser 1999; Sheridan 1999). There is evidence that their coastal territory covered an extensive portion of the coastal Sonoran Desert, spanning from north of Puerto Lobos to as far south as Guaymas, and that they had permanent populations on Tiburón and San Estéban Islands (Moser 1999; Bowen 2000). After European arrival, the Seri faced relentless wars of extermination led by the Spaniards and later continued by Mexican ranchers, with often ferocious battles lasting into the early twentieth century (Spicer 1962; Sheridan 1999; Bourillón 2002). Today, the remaining Seri live in the two permanent villages of Punta Chueca and El Desemboque. According to national census data (INEGI 2000), the total Seri population is around 420 people. Because the Seri are one of the smallest ethnic groups in Mexico, in the 1970s the federal government granted them legal property rights to a portion of their historic coastal territory. The goal of this concession was to increase the Seris' chances of survival by reducing the probability of future conflicts with other local fishers of different ethnic origin. Property rights took the form of the Ejido de El Desemboque<sup>1</sup> and its annex of Punta Chueca

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(“Diario Oficial de la Federación” 1970), a fishing concession granted to the Seri fishing cooperative (“Diario Oficial de la Federación” 1975), and communal tenure on Isla Tiburón, Mexico’s largest island (“Diario Oficial de la Federación” 1978).

The *callo de hacha* fishery is practiced entirely in the Canal del Infiernillo (see figures 1 and 2), which constitutes a small portion of the Seri fishing concession (Bourillón 2002), and where the *callos* are abundant compared to other areas nearby (Moreno, Torre et al. 2005; Moreno, Weaver, et al. 2005). This generates pressure from non-Seri fishers who seek access to the Canal del Infiernillo to harvest *callo*. However, because the Seri are able to control access to it, most non-Seri fishers must negotiate with the Seri to fish the channel (Basurto 2005). Non-Seri fish buyers, as I will explain in more detail below, also need to negotiate their way into Seri territory. In their case, they must gain access to the Seri *ejido*, where the village of Punta Chueca is located, in order to be able to buy *callo* harvested in the Canal del Infiernillo, currently one of the best fishing grounds for *callo* in the region (Moreno, Torre, et al. 2005).

Today, commercial diving for *callo de hacha* (*Atrina* sp and *Pinna rugosa*) is the most important commercial fishery in Seri territory. The *callo de hacha* is a sessile bivalve mollusk widely distributed in the Gulf of California and south to Panama (Brusca 1980). It lives buried in sandy bottoms and is harvested by divers for its abductor muscle; it commands high prices on the national market.

The data on the *callo de hacha* fishery were collected between 2000 and 2001, using ethnographic fieldwork techniques. Collecting such data became possible only after I had visited and worked with the fishing community since 1998. Ethnographic techniques included participant-observation and active participation in all of the fishing activities (harvesting through marketing), and informal interviews with Seri and Mexican fishers and fish buyers. Historical accounts are drawn from formal interviews with the oldest Seri and Mexican divers, as well as with other key informants in the Seri community.

## BEGINNINGS

The first commercial diving fishery in the Canal del Infiernillo probably began sometime in the 1720s, during a “short-lived pearling boom in the area” (Bowen 2000:74). At that time, pearl beds of *Pteria sterna* were discovered along the Sonoran coast, extending northward from Cabo



Figure 1. Map of Sceriland. (Drawn by author)

Tepopa to just north of Tiburon Island. These pearl oyster beds became known as the San Xavier, or Tepoca, placers (Stratford [1746] 1958:62), and it was estimated that by the end of the decade of the 1720s, more than 1,000 pearlers exploited these grounds. Although these reports are thought to have been greatly exaggerated (Sheridan 1999:122), it is likely that many fishers came to shore looking for fresh water when they found it was available at the Tecomate area (Correa [1750] 1946:555). Either way, this probably fueled the uneasiness with which the Seri were watching this sudden invasion of their territory. Conflicts between fishers and the Seri eventually broke out, resulting, on the one hand, in the



*Figure 2. Aerial photo of the Canal del Infiernillo. (Photo by author)*

deportation of some Seri to nearby missions, and on the other, in the Seri killing of several Spanish pearling crews. As a result of the constant conflicts with the Seri, the Tepoca placers were abandoned by 1733 (Mosk 1941:214). It was not until 240 years later that commercial diving by non-Seri fishers resumed in the Canal del Infiernillo.

### FREE DIVING

Commercial exploitation of *callo de bacha* in the Canal del Infiernillo began around 1973. It was started by non-Seri Mexicans hunting sea turtles and exploiting fin fish in the region. According to Mexican and Seri informants, the *callo* buyers in 1973 were Sergio Padres, Pancho Laguna, and Fidel Calderón from Guaymas, and a man from Hermosillo whose surname was Barol. These individuals brought wooden *pangas* (with eighteen- to forty-horsepower outboard motors) and Mexican diving crews from Sinaloa and southern Sonora to free dive for *callo* in the Canal del Infiernillo. The divers harvested mostly *callo redondo* or *callo*

*de hacha* (round or rugose pen shell, *Pinna rugosa*) near El Alamo on Bahía Sargento and in the estuary near Víboras. Fishing crews were made up of two divers and a boatman. Harvesters free dove to the bottom to extract the round pen shells with a tool resembling a hook. They then deposited the catch in a floating mesh bag made from two long segments of old gill nets sown together and tied to the inner circumference of a truck inner tube, forming the bag's "mouth." The divers could thus pull the bag along as they dove. Once the bag was full, the *panga* would approach and retrieve the *callos*. Two or three full bags filled up a *panga*, which then headed back to shore around noon. Initially, the fishing fleet consisted of five or six  *pangas* (around twelve fishermen).

Once ashore, each diver had to open and extract the muscle from 300 to 600 organisms, yielding between eighteen and twenty kilograms of meat. The total catch per fishing crew averaged fifty to sixty kilograms, and the price ranged between fourteen and eighteen pesos per kilogram. One or two people received the scallops and acted as liaisons with the fish buyers in the field. Their main duties were to weigh and record the catch of each fisherman for later payment. The product was usually shipped back to town every other day, but this varied depending on the volume of *callos* harvested and the availability of ice.

Fishermen had provisions and water to camp for about fifteen days. However, they typically were only able to dive five to seven days due to weather conditions and sea currents. The fishermen spent the rest of the month with their families, back in their hometowns, after traveling to Hermosillo or Guaymas to collect their payment from the fish buyer. Fishing for *callos de hacha* in the Canal del Infiernillo took place only during the winter, which suggests the availability of neoprene suits at that time. In the summer, the divers would work in agricultural fields or fish elsewhere.

In 1978, non-Seri *callo* divers discovered large beds of *callo riñón* (kidney pen shell, *Atrina tuberculosa*) in the shallow waters between Santa Rosa estuary and Punta Chueca. Word of this find spread quickly and the number of non-Seri *callo* divers in Punta Chueca increased to twenty-five. By 1978, a prominent *callo* buyer in Punta Chueca was buying from 400 to 600 kilograms of *callo riñón* daily, at prices ranging from twenty-five to twenty-eight pesos per kilogram. The *callo* fishery was so profitable that buyers frequently paid divers' travel costs.

In 1980, Productos Pesqueros Mexicanos (PROPEMEX—a public company created by President Luis Echeverría in 1971 to provide technical and infrastructure support to fishing cooperatives in Mexico) entered

Seriland (Lobato 1996:329). PROPEMEX, which provided employment opportunities for Seri and non-Seri alike, constructed seafood warehouses in Punta Chueca and El Desemboque. They also provided new fiberglass *pangas* and fishing gear. Local fishermen recall that fish were so abundant in the Canal del Infiernillo that the warehouse in Punta Chueca was constantly filled to overflowing. There was little need to go far from Punta Chueca to fish.

During PROPEMEX's tenure in Seri territory, from 1980 to 1984, *callo de hacha* fishing in the Canal del Infiernillo nearly ceased because most of the *callo* fishermen worked for PROPEMEX. But this was soon to change. In 1984, PROPEMEX halted its fishing operations in Seriland as a result of overfishing and internal business problems.

In retrospect, PROPEMEX indirectly contributed to major changes in Seri culture because it attracted and provided steady employment for non-Seri fishermen in Seriland. Many of these fishermen married Seri women and became part of the Seri community. Inter-marriage between Seri and non-Seri is frowned upon by most Seri, who in the past often ostracized Seri women who married non-Seri. In 2001, however, there were seventeen non-Seri fishermen residing in Punta Chueca who were either married to Seri women or the progeny of intermarriages.

PROPEMEX also played a major role in shaping the future of the *callo de hacha* fishery in Seriland. When PROPEMEX left the Canal del Infiernillo it gave its *pangas* and fishing gear to the Seri fishing cooperative as a way to settle outstanding debts. Gradually, Seri fishers acquired diving compressors already in use elsewhere in the region, and Seri participation in commercial diving activities dramatically increased. Commercial free diving in the Canal del Infiernillo, however, came to a complete halt.

### HOOKAH DIVING

On a regional scale, the availability of hookah diving assemblies led to the second boom of benthic resource exploitation in the central portion of the Gulf of California, more than two hundred years after hundreds of pearl oysters had attracted scores of divers to the region (del Barco 1973:141). Hookah setups are built using the air compressor and engine of a commercial paint sprayer (see figure 3). The compressor's outlet is connected to a reserve air tank to which one or two sets of one hundred-meter hose are attached with air regulators on the end. A beer



*Figure 3. Hookah air compressor used by Canal del Infiernillo divers.  
(Photo by author)*

keg is modified to serve as the air reserve tank to provide an emergency air supply in the case of compressor failure. To adapt the beer keg for this function, a pressure gauge and several valves (retention, check, and outlet) must be installed.

The use of such small-scale hookah diving assemblies took hold in the late 1960s and early 1970s, in the nearby fishing town of Kino Bay, or Bahía de Kino (Cudney-Bueno 2000:41; A. H. Weaver, Kino fisheries researcher, personal comm. 2000). Nevertheless, it was likely not until the mid-eighties that the use of hookah equipment became widespread among the Seri (Chenaut 1985:88). The presence of PROPEMEX in Seriland and its focus on fin-fish fisheries delayed the use of diving compressors in the Canal del Infiernillo. However, when PROPEMEX left the channel in 1984, after more or less five years of intense exploitation of its fish stocks, Seri readily resorted to previously underexploited resources such as benthic species, because they were abundant and there were non-Seri fishermen willing to do the diving. Some evidence to support this conclusion originates from a report by Victoria Chenaut. She notes that the *callo de hacha* “abound in its coasts [Canal del Infiernillo], but because the Seri do not dive, [they] often grant permits to [non-Seri] divers to extract it” (Chenaut 1985:88).



Although for the most part Seri preferred not to dive (and still do), there are reports that a few Seri have been hookah diving since the end of the 1970s for commercial and subsistence purposes. According to Seri informants, members of the Morales Blanco family—Jesús Morales Colosio and his sons, Ramón, Arturo, and Roberto—brought the first hookah rig to Punta Chueca, while the Astorga Flores brothers—Gonzalo, Santiago, and Rosalío—were the first to own one in El Desemboque. Alfredo Monroy and Alfonso Mendes are also thought to have been among the first Seri hookah divers.

Ramón, Arturo, and Roberto were taught to dive by their father, who was an accomplished free diver. He, in turn, had learned to dive while working with the divers from Sinaloa and Guaymas, who had been free diving in the Canal del Infiernillo since 1973. In 1977 they bought a hookah setup with the help of their uncle Efrain Estrella Romero, then president of the fishing cooperative. The hookah setup cost twenty-five pesos and looked very much like those used today. It included a compressor, a gasoline motor, two sets of hoses, two first-stage breathers, two neoprene wetsuits, and two pairs of fins. Although Moraleses mostly dived for *callo redondo* (*Pinna rugosa*) in the channel, they also harvested *callo de escarlopa* (rock scallops, *Spondylus calcifer*) in an area known locally as El Jamoncillo, in the north mouth of the Canal del Infiernillo.

About the same time, the Astorga Flores brothers also started to dive using an air compressor in El Desemboque. They had recently been taught to dive by Marco Antonio Luján, a Mexican fisheries technician from Hermosillo and friend of Santiago Astorga. They got the hookah setup from Fidel Calderón, a fish buyer from Bahía de Kino, paying him for the diving compressor with their diving catches. The Astorga Flores brothers mainly dived for rock scallops and *pulpo* (octopus, *Octopus* spp). They mounted the hookah to the *panga Amalia*, owned by Adolfo Burgos (who later became a diver too), and explored and dived around Tiburon Island (mainly the south, west, and north sides) and Patos Island. They also frequently dived in front of El Desemboque village and in areas nearby known as Las Estacas, Las Aguitas, Las Cuevitas (north of El Desemboque), El Mogote, Mancha Blanca, Piedra Colorada, and Sargento (south of El Desemboque). Other species commonly harvested included *caracol de uña* (giant eastern Pacific conch, *Strombus* spp); *caracol chino* (black murex, *Hexaples* spp); *callo de árbol*, or *concha nacar* (western wing pearl oyster, *Pteria sterna*); *langosta* (spiny lobster, *Panulirus* spp); and *callo redondo* and *callo riñón* (Brusca 1980).



## CURRENT FISHING PRACTICES

The *callo de hacha* hookah fishery of Seriland is not regulated by Mexican federal or state laws, and during the past few years, *callo* fishing activities have occurred year-round (Basurto 2005). Production, however, is greatest between October and June. Fishers believe that it is possible to harvest *callo* year-round because of its abundance in the Canal del Infiernillo, reliable national demand, and high market prices.

The number of people fishing for *callo* varies considerably throughout the year. For example, during the more than thirty trips that I made with Seri fishermen during 2000 and 2001, I usually observed anywhere from five to twenty *callo de hacha* hookah setups working at all times. In January of 2001, however, fishermen reported that up to seventy *pangas* were diving in the Canal del Infiernillo, the highest number of *pangas* Seri fishers had seen in recent times. Because the Seri of Punta Chueca own at most twenty hookah rigs, most of these fishermen were non-Seri from Bahía de Kino, where the catch was poor.

Divers' attire is highly variable. However, "standard" gear includes a diving mask, plastic boots, shoes or fins, a weight belt, and a custom-made hook for detaching the *callos* from the bottom (see figures 4 and 5). Depending on the water temperature, the diver may need to use a wetsuit and hood. When the water is warm, usually a short-sleeved wetsuit will suffice. In the winter, divers wear as many wetsuits as needed. Some even wear pantyhose under the wetsuit for added warmth. To protect the wetsuit from potential tears from rocks, coral, or *callo de hacha* shells, some divers also wear pants and a shirt outside it. Acquiring a wetsuit in the region is not cheap or easy to do. According to fishermen, a medium-sized, half-inch-thick suit was worth more than \$500 USD. Pants and long-sleeved shirts are also worn during the summer, to protect the skin from irritant hydroids found in the channel, such as *Plumularia* spp, *Porpita* sp., or *Physalia* sp. Cotton gloves are the most affordable and common, but I have seen divers use neoprene or even latex ones as well. I saw divers making collection bags out of two pieces of old shrimp trawl nets sewn together and attached to the inside wall of an old tire.

Once in the water, some divers attach themselves to a long rope held at the other end by a crew member or tied to a floating buoy. This helps to locate the diver in the water, and serves as a communication system between diver and crew through a system of pulling signals. Some fishermen also use the air hose itself to deliver signals to the divers, which



Figure 4. Aboard a panga outfitted for callo diving. (Photo by author)

I learned when the crew of the boat decided that it was time to go and started dragging me off the bottom by pulling the hose (and thus my air regulator) until I reached the surface.

Usually fishing teams are formed of two, three, or four crew members per boat. The crew consists of one or two *buzos* (divers), a *popero* (helmsman), and a *matador* (meat preparer). The number of crew members and the selection of individuals seems to be determined by many interrelated factors: the partitioning of a catch among crew members, the number of fishermen required to do the job, the amount of *callo de bacha* expected to be harvested, price, ethnic origin of the fishermen, ownership of *panga* and fishing gear, Seri communal fishing rules, and family ties and kinship.

As previously mentioned, participation by non-Seri fishermen in this fishery is high, and between 2000 and 2001, 87 percent of the fishing teams included crew members of an ethnic origin other than Seri. These estimates include those fishermen who come from nearby towns to fish and those who are already living in the Seri community. Some of the



*Figure 5. Callo diver connected to hookah system and outfitted in neoprene wetsuit. (Photo by author)*

non-Seri fishermen that come from elsewhere bring their own *pangas* and fishing gear.

Most Seri fishermen are not divers. As in any other hookah diving fishery, diving is still the most exhausting and dangerous part of the job. Most Seri prefer to hire outside divers, who, facing scarcity in their own fishing grounds, are continuously attracted to the relative abundance of

the Canal del Infiernillo and its shallow depths, which offer them a safer place to dive in comparison to the depths they must attain to harvest *callo de hacha* in other areas of the Gulf of California. Nevertheless, owing to the shallow and narrow dimensions of the Canal del Infiernillo, tidal currents can be very strong and, thus, the best times to dive are during low-amplitude (neap) tides. Fishermen know that neap tides take place two or three days before, during, and two or three days after the quarter moon. Since this occurs twice a month (during waxing and waning), divers have roughly fifteen days of good diving per month. During the other fifteen days, when spring tides occur, currents are strong and diving is very strenuous. In some areas of the channel, the currents cover the *callos* with sand. In other places, underwater visibility improves and the *callos* are easier to find. While there are tradeoffs to diving in either tide period, divers prefer to work during neap tides and rest during spring tides. The tides, however, are not the sole determinant of fishing times; other factors, such as the availability of gasoline or fishers' immediate cash needs, frequently play an important role in decision making and selection of fishing times. Selecting time and place is customarily the duty of the diver. Nevertheless, in the *callo de hacha* fishery, when the diver is an outsider this does not apply. Then, the decision is usually reached jointly with the owner of the gear or by consensus of the crew.

From an outsider's perspective, selecting a diving location always seemed like an art, a delicate balance between profit and risk. Fishermen told me that an ideal situation of maximum profit is believed to occur when the diver discovers a new *callo* bank and no other divers are around to compete for the harvest. However, probing for new *callo* banks is a risky endeavor, and the odds of finding a new bank are variable, potentially resulting in little harvest and an economic loss for the day. A fishing team, therefore, often chooses a minimum-risk strategy, deciding to fish in an area where other teams are already harvesting *callos*. This was the most common scenario I observed in the Canal del Infiernillo. Fishermen prefer this strategy because the high productivity of the *callo* banks in the channel and the low number of *pangas* (due to Seri access control), together generally guarantee an acceptable harvest for all divers. When one area becomes unproductive, fishing teams move to other productive areas that have not been recently picked over. Fishing effort is deployed flexibly and opportunistically; in some cases the initial success of one group seems to encourage others to converge upon an area. In other cases, fishing teams change to a new area at roughly the same time. Here, the tradeoff is that finding the richest beds within a known fishing



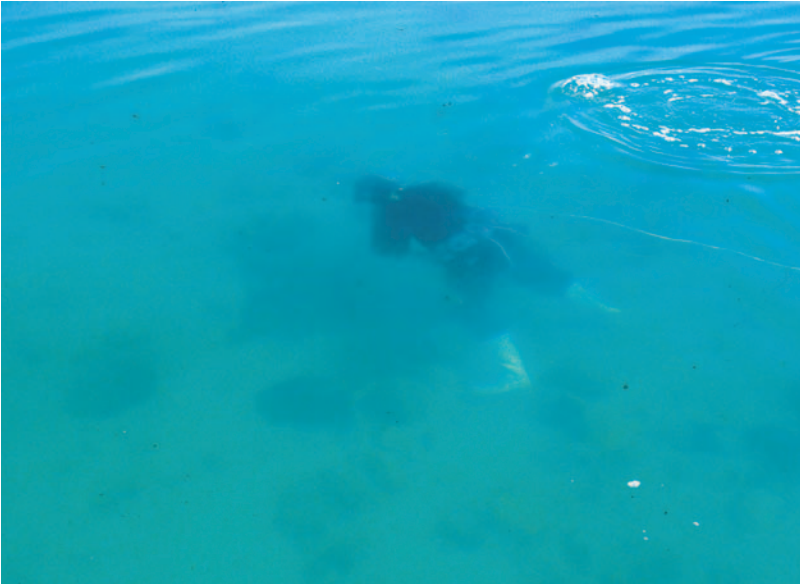
Figure 6. *Callo de hacha*. (Photo by author)

area is more likely when several fishing teams are present. The costs of searching are thus spread among the group, reducing the individual risk and uncertainty of not finding a good *callo* bed. By maintaining visual contact with other fishers, it is possible to determine where and how much *callo de hacha* is being harvested and to relocate accordingly.

Today, the most important commercial species of *callo* in the Canal del Infiernillo is the sessile *callo riñón*. It lives completely buried in the sand; the only portion visible to the diver is the small aperture of the two valves through which the animal filters planktonic organisms and breathes. With any disturbance in its surroundings, the *callo* closes its valves, camouflaging itself in the sand.<sup>2</sup> In this context, a good diver must know how to move underwater to find *callos de hacha* and how to extract them from the bottom, and must have a good underwater communication system with crewmates at the surface (see figure 6).

Based on personal preference, divers choose to swim over or walk on the bottom. Either way, the diver hangs the collection bag around his neck so that he has both hands free to work. Swimming divers claim that





*Figure 7. Walking on the sea bottom in search of callo. (Photo by author)*

they can see *callos* more easily since they are closer to the bottom. The most noticeable difference between the two techniques seems to be that walking divers can carry around bigger bags (see figure 7).

During times of heavy tidal currents, divers prefer to approach a *callo* bank from downstream, so that the sediment they stir up as they pass by moves behind them and does not block their view or disturb the *callos* farther upstream. Once one *callo* has been located there are usually more around. Therefore, before moving forward to pick up that individual, the diver looks around, making a mental note of the location of all *callos de hacha* in his line of sight. Next, he starts approaching all of them in an orderly fashion, working against the current. To extract a *callo* from the bottom, the diver introduces the hook between its two valves, which close at contact. He twists the hook to lock it, and pulls the animal out. In the event that the *callo* closes its valves before the diver introduces the hook, he breaks through one side of the shell with the hook and then pulls it out. In both cases, the important thing is to avoid damaging the meat, meaning that the diver needs to know where the scallop meat is located.

When the bag is full, the diver either surfaces with the bag (increasing the risk of injury),<sup>3</sup> or asks the crew to pull it up and send down a new

bag. This is communicated to the crewmates through a series of tugs on the hose or on an alternate line attached to the diver and held at the other end by a crew member or attached to a surface buoy. This is a more efficient practice, since it decreases dive time and allows the diver to keep working the same area without interruption. Still, I only observed the most experienced divers (usually non-Seri) practicing this.

Once the animals are pulled out of the bag, the *matador* starts the process of extracting the meat from the shell. There are basically two ways to do this: (1) by separating the shells without breaking them and cutting the scallop meat (adductor muscle) that holds the shells together with a knife; (2) by breaking the shell using the unsharpened side of the knife blade, then reaching in with the knife to remove the scallop meat. Fewer fishermen practice the former technique because it's harder to learn, even though it is more efficient (i.e., faster and less messy, and those who perform it consider it an essential skill of a "true" *callo de bacha* fisherman).

Once the shell is opened and the organism set apart in a container, the shells are discarded in the ocean. Then, the *matador* separates the scallop meat from the guts, mantle, and gonads. The guts are always discarded, but fishermen sometimes keep the mantle to take home for their own consumption. If time and other duties allow, the separation of meat from guts and mantle is done aboard the boat; if not, it can be done back at the village. When the separation is conducted ashore it is not uncommon for family or other members of the village to help, usually keeping the mantles as compensation for their work. This is also a good opportunity for non-fishing members of the village to inspect the fishermen's catch and indirectly monitor the state of the fishery.

The catch is usually stored in seawater or ice at the crew captain's home until the fish buyer arrives in the evening. Then the product is weighed and put in five-kilogram bags. Any debts or credits owed the fish buyer are discounted from the value of the catch before payment to the fishermen is made. Credit may be in the form of cash, gasoline, motor parts, or any piece of fishing gear that the buyer acquired for the fishermen. Depending on the nature of the arrangement with each fisherman, payment is made daily, weekly, or whenever possible. A typical fishing day ends when transactions with the fish buyer are concluded and every crew member gets his monetary share. If gasoline is available, the weather forecast good, and spirits high among the crew, the process will start again at sunrise.



The relationship between Seri fishers and non-Seri fish buyers, who commercialize 90 percent of the *callo* harvested in the Canal del Infiernillo, is a peculiar one. Regionally, *callo de bacha* fish buyers have a great influence in fishers' harvesting patterns. Because of natural differences in habitat, fishing areas offer varying colors, shapes, and sizes of *callo* (Basurto, unpublished data). Fish buyers pay a premium for the product that offers the quality the market demands and thus, have a direct influence on fishing decisions, like where to fish and how much to harvest. However, non-Seri fish buyers are not able to exert as much influence as their counterparts in fisheries outside Seriland do. The existence of formal property rights and informal rules by which the Seri control access to their fishing grounds allows them to counteract some of the bargaining power of fish buyers. For instance, Seri communal ownership of the land (in the form of an *ejido*) that surrounds their *callo de bacha* fishing grounds gives them more authority to determine whom they will conduct business with. This successfully brings bargaining forces to a closer balance and provides further incentives for the fish buyers to remain on good terms with their business colleagues. The Seri are certainly aware of these factors and have designed a set of rules that any individual would need to follow in order to conduct business in the Seri *ejido*. One of the main requirements is the payment of a fee that grants non-Seri fish buyers the right to purchase products from Seri territory.

In general, fish buyers (and non-Seri fishermen) believe that the Seri are not reciprocal and are difficult to work with. For instance, when a Seri fisherman and a fish buyer engage in a business relationship, the fish buyer usually purchases gasoline for the Seri to go out to fish. The fish buyer expects that the *callo* harvested using that gasoline will be sold to him exclusively. However, this does not always happen. If for any reason the Seri uses the gasoline for something else (e.g., to run an errand to town thirty kilometers away), or fishes and sells the product to someone else offering a better price, the only choice for the fish buyer is to keep lending to the Seri in hopes of recovering the money or to absorb the loss. Both sides understand that if the fish buyer stops the purchases of gas, the Seri would also break the agreement to pay him back. One fish buyer stated that he was still doing business with the Seri not to make a profit, but in hopes of recovering the more than \$5,000 USD that he had lent in gas to a group of Seri fishers.

Other factors such as stiff competition among fish buyers, few means by which they can control the fishery (since they do not own the fishing gear that the Seri use), and the relative internal unity of the Seri commu-

nity when it comes to dealing with foreigners and Mexicans in particular, further help to balance the bargaining power between both parties.

## CONCLUSION

Diving fisheries have played an important role in the fishing history of the Gulf of California and until recently we knew practically nothing about them. Fortunately, interest is increasing and we have started to understand some basic aspects of their intricate dynamics and potential for conservation (see Cariño 1996; Cudney-Bueno 2000; Fernandez 2003; Basurto 2005; Moreno, Torre, et al. 2005). This piece is another attempt to contribute to this effort.

The Seri *callo de hacha* fishery provides important research opportunities and can yield useful conservation lessons, particularly given the current interest in better understanding how marine protected areas can become tools for better fisheries conservation (Gell and Roberts 2003). First, it provides a good “bounded” research site, as the entire fishery takes place inside the Canal del Infiernillo, a shallow, narrow, and relatively small body of water (Torre, Bourillón, and Weaver 2004). Second, *callos* are still abundant inside the channel but are no longer so in areas outside of it (Moreno, Weaver, et al. 2005; Moreno, Torre, et al. 2005). Finally, the channel is a fishing concession where the owners can in fact control access by outside users (Basurto 2005). ❖

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#### NOTES

1. An *ejido* is a piece of land held in communal ownership but divided into separate family plots (Taylor 2003).
2. The second commercially important species is the *callo redondo*, which usually exposes a third of its body, making it easier to spot and pull out.
3. The chances of suffering a diving injury increase with diving time, effort, and depth. However, because the Infiernillo Channel is very shallow (average depth is 5.5 meters), few diving accidents have occurred. The National Association of Underwater Instructors (NAUI) considers it safe to dive for unlimited time in depths of less than ten meters (one atmosphere of pressure).

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