Historical Exploitation of the California Sea Lion, *Zalophus californianus*, in México

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Introduction

California sea lions, *Zalophus californianus*, have been exploited for centuries along the Pacific coast of the United States and northern Mexico, originally for subsistence and later for commercial purposes. Such use has been revised for California (Cass, 1985), but not for Mexico. This paper reviews the history of California sea lion exploitation in Mexico, based on all published and archival sources available to us. Some of these sources have become unavailable or have been lost since we reviewed them, several years ago.

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ABSTRACT—The exploitation of California sea lions, Zalophus californianus, *in Mexican waters can be divided into four periods as defined by political characteristics of the country: Prehispanic, Colonial, Independent, and Postrevolutionary. During the first period (pre 1533), Native Americans took sea lions at low levels. During the second (1534–1821) and the third (1822–1911) periods, most exploitation was by foreigners and was incidental to other marine mammal harvests. During the Postrevolutionary period (after 1911), sea lions were exploited by Mexican and U.S. citizens for several commercial uses. Exploitation officially ended in 1982, although some small-scale poaching still occurs.*

Sea lion hunting in México can be placed into four historical periods as defined by some of the nation's political events: Prehispanic (to 1533), Colonial (1534–1821), Independent (1822–1911), and Postrevolutionary (after 1911). The dates of these periods are somewhat arbitrary, but give a general framework in which actions and policies can be understood. We ended the prehispanic period symbolicaly in 1533, when Bahía de La Paz was discovered and the Spanish stepped for the first time on the Peninsula de Baja California. The year 1821 marked the ending of the Independence War, and 1911 marked the step-down of Porfirio Díaz as long-time President of México.

Prehispanic Mexico

Prehispanic maritime tribes used California sea lions for meat, shelter, clothing, and the manufacture of tools (Aschmann, 1959). At least in northwestern Baja California, on the Pacific coast, sea lions were extensively used 1–2 millenia before European contact (Hubbs and Roden, 1964). Native inhabitants seem to have trekked periodically to the shores of Laguna Ojo de Liebre (or Scammons Lagoon) to feast upon a number of resources, including sea lions (Henderson, 1972). We found no further records of prehistoric sea lion use in Mexico, but at least two Indian groups, studied after European contact, can be used as surrogates for the precontact exploitation, as their technology had not been modified by the time their hunts were recorded.

The Concaac (or Seri), a seafaring tribe of central Sonora, hunted sea lions from Isla Tiburón to Isla Ángel de la Guarda, and perhaps other islands, in the Sea of Cortés (or Gulf of California) (McGee, 1898). They killed them by hitting them on the head and nose with rocks (Felger and Moser, 1985). The Concaac used sea lions (McGee also used the term "seal," although no populations of true seals are resident in the Sea of Cortés, and northern elephant seals, *Mirounga angustirostris*, are only occasionaly encountered) for food, and they probably used the teeth to make harpoons to hunt sea turtles (McGee, 1898; Felger and Moser, 1985). Skins were used to make footwear and groundcloths and for protection against rain (Felger and Moser, 1985). McGee (1898) reported finding pieces of skin and bones of "seal," and a basket whose bottom had been covered with "seal" skin at one ranchería (a small congregation of huts) on Isla Tiburón.

In 1910, Lumholtz (1990) recorded Híac ed O'odham (or Sand Papago) use of sea lions at current-day Puerto Peñasco. The sea lions were killed by hitting them on the nose with rocks, and their skins were used to make sandals and straps.

Colonial Mexico

Spanish involvement with the Pacific Ocean resources along the Californias was basically focused on the extraction of pearls and the use of sea otters for their skins (Mosk, 1931; Ogden, 1932; Gerhard, 1956). During the pursuit of these species, sea lions and other marine mammals were given little attention, if at all.

Sea otters were heavily hunted in the North Pacific as well, and when the returns from these hunts began to

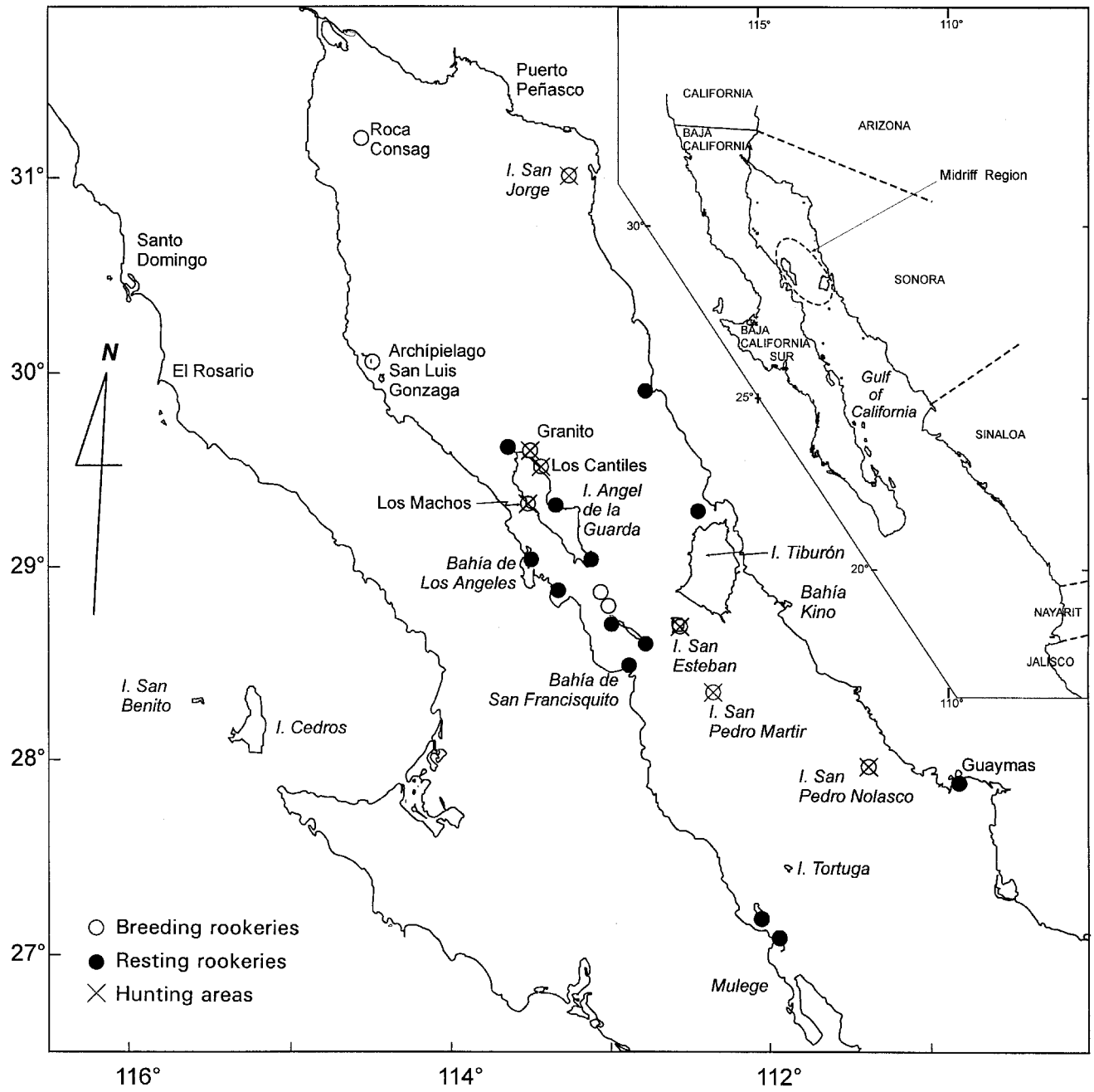

Figure 1.—Sea lion rookeries and commercial hunting sites in the central-northern part of the Gulf of California, Mex.

dwindle, a Russian-American coalition (1803–1812) and independent Russian hunters (1809–1823) heavily exploited southern sea otters, *Enhydra lutris*, in addition to northern and Guadalupe fur seals, *Callorhinus ursinus* and *Arctocephalus townsendi*, respectively, along the Pacific coast of both Upper and the Lower California. Although not the focus of this exploitation, some California sea lions were also taken. This early 19th century period is best described by Ogden (1933), from which we obtained the following extracts.

In 1804, 3 months were enough for the crew of the vessel *O'Cain* to produce 1,100 skins, probably mostly from sea otters, in addition to 700 that captain O'Cain, the master, purchased from Spanish officials and missionaries. Sea otter hunting at this time caused such a population depletion between El Rosario and Santo Domingo, that governor José Arrillaga was prompted to report it to the Viceroy. The number of California sea lions taken during these hunts was not recorded.

In 1806, two Russian-Boston ships hunted along the Pacific shore of Baja California. Expert Aleut hunting gangs were stationed for long periods on different islands. From June to August of that year, one of the ships had taken sea otter and [Guadalupe fur] "seal" skins worth $60,000 in the Canton market. In following years up to 1812, this hunting effort increased, still focused on sea otters and fur seals, but California sea lions were also taken for their skins.

Sea lions have been particularly useful for various commodities. For example, when Fort Ross, on the northern California coast, was a Russian camp, sea lions at the nearby Farallon Islands were a steady source of meat and other products (Ogden, 1933). However, being a "maintenance activity," sea lion hunts were conducted without records of any kind. In this sense, it is particularly relevant that the hunting gangs employed in México were of Aleut origin, as sea lions were a fundamental item in their culture. Sea lions supplied them with meat, blubber, oil, intestines, stomach, and skins for their bidarkas (Scammon, 1874). It is unreasonable to believe that they did not kill any sea lions while stationed on Baja California islands. However, they probably did not engage in the type of sea lion drives used to on the Aleutian Islands as reported by Scammon (1874).

The Russian-Boston hunters hunted illegally, perhaps most of the time. They sometimes blatantly disobeyed Spanish officers, backed by their firearms, and even captured three Spanish officers in Ensenada; other times they avoided them (Ogden, 1933). On 16 April 1811 the Spanish government issued a decree allowing the free take of sea lions, whales, and sea otters in all its New World domains (Sierra and Sierra, 1977), a decree that seemed to have had little effect on the commercial exploitation of sea lions.

Independent Mexico

One early policy of the young Republic of Mexico, the nationalization of commerce, included the appropriation of fishery resources in ways beneficial to coastal communities in 1829 (Sierra and Sierra, 1977). Under this nationalistic scheme, the Russian sea otter hunters were forced to seek an arrangement with Mexico. Some arrangements were made, but the resulting hunts were mostly restricted to the north of San Diego (Ogden, 1933). Only in one instance, in 1828, was the *Baikal*, a ship bound for San Quintín to load salt, allowed to carry two canoes to hunt for sea otters, of which they took 63 between San Diego and San Quintín (Ogden, 1933). It is unknown whether sea lions were hunted on this trip.

On the other hand, by the end of the Spanish rule of Mexico, foreign seamen had begun to explore the west coast of Baja California for sea mammals, including sea lions (Henderson, 1972). Although these whalers focused mostly on the gray whale, *Eschrichtius robustus*, they also took sea elephants and "seals" (apparently sea lion) for their oil (Henderson, 1972).

In the Sea of Cortés, sea lion hunts were unrestricted during the early days of independence. To regulate and terminate the "excesses of the seal hunters," President Ignacio Comonfort granted "exclusive privileges to fish the seal or sea calf[1] along the coasts and islands of the Gulf of California" for an 8-year period to Manuel Mújica, on 6 June 1856. Mújica was to pay the government 80 cents per gallon of oil (Lluch-Belda, 1969). Two years later (30 September 1858), Luis Rivas Góngora was given a 10-year permit to take sea lions and whales in the Sea of Cortés (Sierra and Sierra, 1977).

During the 1860's, the government of Benito Juárez decreed that the hunting of sea lions and whales was to be done according to arrangements with formal obligations. Later, in 1872 new rules allowed for more intensive harvests (Sierra and Sierra, 1977). At the same time there was a deep interest in the development of Baja California. These two factors could explain the apparent shift during this period to an industrialized hunt of sea lions (LeBoeuf et al., 1983). In this context a nonexclusive concession allowed a company to exploit several marine resources, including sea lions, from Altata, west of Culiacán, to the mouth of the Colorado River (Sierra and Sierra, 1977).

The oil of the California sea lion is of low quality and was used in the mid 19th century mainly by tanners to process leather (Cronise, 1868). Anecdotal evidence indicates that the period from 1860 to 1888 brought intensive sea lion harvests, especially for oil extraction (Banfield, 1974; Ronald et al., 1982). Later, trade in hides (for glue and low quality leather) and trimmings (the genitalia, lips with whiskers attached, and gall bladders of bulls) developed (Rowley, 1929; Banfield, 1974). Pup skins were of low quality and of little commercial interest, although they were commercialized to some extent in California (Cronise, 1868; Rowley, 1929).

Adult sea lions were hunted along the Pacific coasts of both California and Baja California, and Scammon (1872, 1874) felt that thousands of sea lions were taken. However, there were no means to obtain accurate accounts on the number of sea lions and other marine mammals killed along the Pacific coast (Taylor, 1869). Browne (1869) considered that these hunts had not attracted as much attention as they deserved, as "myriads of seals and sea lions line the shores and fall an easy prey to the hunter." His statement, and also those of Taylor (1869), apparently referred to only the Pacific coast of Baja California.

While sea lions were intensively hunted along the Pacific coast, the activity was apparently much less intense in the Sea of Cortés (LeBoeuf et al., 1983). During the late 1880's sea lions were hunted for their skin and oil on islands in the Midriff Region of the Sea of Cortés, especially in northern Ángel de la Guarda and San Pedro Mártir (Bahre, 1983). In 1884, fishermen from Mulegé killed 287 sea lions, and in 1905 sea lions were hunted from small fishing skiffs near San Pedro Mártir, Ángel de la Guarda, and San Lorenzo (Nelson, 1921). Such hunts were sporadic and disorganized, and Nelson (1921) considered that the numbers of sea lions were too small to warrant systematic exploitation.

[1] A rather uncommon denomination for the sea lion.

Sometimes sea lions were killed for immediate use. For example, during the late 19th century, eggers (collectors of seabird eggs) on the Farrallon Islands killed sea lions to supply oil for their lamps (Nordhoff, 1875). Egging was widespread in the Sea of Cortés in the late 19th century, and it is likely that sea lions were incidentally killed there. Explorers in the Sea of Cortés also killed sea lions on occasion to obtain oil for their lamps, as noted by Hardy (1829).

At the end of the 19th century, under the rulership of Porfirio Diaz, several concessions to hunt sea lions were granted to Mexican citizens. However, the grantees mostly sought to sell their rights to Americans, Canadians, or Japanese (Bell, 1923). The number of sea lions hunted under such arrangements was not recorded.

Several factors caused the termination of sea lion hunting, or almost so, at the end of this period. The hunt of sea lions brought a steady decline in their numbers along the coast of Alta California into the late 1870's (Bonnot, 1928), and it can be presumed that it caused a similar reduction on the coast of Baja California. As a result, this species was declared protected in California in 1909, an action that caused a halt in the general trade in sea lion products in the United States (Rowley, 1929). However, the Mexican concessions were still in effect. Whether the U.S. protection reduced the hunt in Mexico by restricting the landing of sea lion products in California ports, or increased it since the markets were still available and had a reduced supply, is not known. Nevertheless, declining prices of sea lion oil and hides eventualy made their hunt unprofitable (Bonnot, 1928).

Postrevolutionary Mexico

The Mexican Revolution (1910–21) may have had little affect on sea lion hunting, especially along the Pacific coast, as this war was little felt in Baja California, and the short-termed presidents of the country during it were preoccupied with political matters. Nevertheless, even before the revolution ended Mexico began to reorganize the administration of its natural resources. During the Carranza regime (1917–20), all of the old fishing and marine mammal hunting concessions were cancelled, and various special decrees and regulations were issued. These administrative actions created uncertainty and tended to disorganize the fishing industry (Bell, 1923). However, new entrepreneurs soon appeared (Sierra and Sierra, 1977), and sea lion hunting was again allowed in 1918 (Boletín Oficial de la Secretaría de Agricultura y Fomento, 20 June). During the regime of President Álvaro Obregón (1920–24), fishing, including the hunting of sea lions, was declared free, though subject to a small exploitation fee (Bell, 1923). After the political turmoil of the Revolution settled, the Mexican government slowly imposed a more orderly administration, in the evolution of which the hunt of sea lions went through different stages.

From 1930 to 1940 there was an open hunt (Lluch-Belda, 1969; Zavala-González, 1993). From 1941 to 1955, sea lion hunting was allowed (but a closed season was in effect), from 1956 to 1969 there was a total prohibition, and from 1976 to 1981 hunting was again allowed, with seasonal closures (yearly issues of the Cuadro Oficial de Vedas and dispositions by the Dirección de Pesca e Industrias Conexas of different years). The hunt was prohibited to foreigners in 1976 (Diario Oficial de la Federación, 13 February), and a general prohibition came in effect in 1982 (Secretaría de Pesca, Cuadro Oficial de Vedas).

There are two apparent contradictions in the previous chronology. Hunting calendars for 1941–55 indicated the closed season was from 1 May to 15 July, which seems clearly an error. A 1946 disposition by the Dirección de Pesca e Industrias Conexas and all later calendars indicate this period as the open season. Also, all later hunting was precisely in this period. At that time the information was presented in tables that showed closed and open seasons with shaded and unshaded bars; the meaning of the shading on the calendars from 1941 to 1955 appears to have been reversed (the tables, revised by A. Zavala in 1991, are no longer available). A true contradiction occured in 1971 when the hunting calendar indicated a complete prohibition, but when there was also a disposition by the Dirección de Pesca e Industrias Conexas allowing the hunt of sea lions from 1 May to 15 July. We cannot determine whether this represented an experimental hunt or a political favor superimposed on the prohibition, or an administrative error.

Capture of sea lions for zoos, aquaria, and exhibitions, small but lucrative, developed in California in the 1920's (Banfield, 1974; Mate, 1978; Ronald et al., 1982). This activity often took nursing females, leaving the pups to starve (Bonnot, 1931). Whether any captures of this sort were carried out in Mexican waters is unknown.

Although the industrialization of petroleum products reduced the market for marine mammal oil early in the 20th century, between 1930 and 1945 sea lions were still hunted. Along the Pacific coast of Baja California, some animals were killed for their skins. In 1939 a large number of undressed carcasses were found on Islas San Benitos (Abbott, 1939). Other animals were killed for their trimmings which were sent to the Chinese market, but economic pressures and unsettled political conditions in China reduced this market for Baja California products by the late 1930's (Abbott, 1939).

Also, during the late 1930's sea lion were hunted along the Pacific coast of Baja California by the Dr. W. J. Ross Company, to produce canned dog and cat food (Abbott, 1939), under a concession from the Mexican government. The operation, similar to that of contemporary whalers, made use of three ships, a refrigeration-equipped "killer" ship, a factory ship, and a tender. Fry (1939) speculated that the very high California sea lion counts in California in 1939 could have resulted from individuals moving north to escape those Baja California hunts.

Members of the San Diego Society of Natural History, lead by Clinton G. Abbott, requested that the Mexican government impede such activities. On 8 February 1938, Miguel A. Quevedo, head of Mexico's Forestry, Wildlife and Fisheries Department, reported that

he had given orders not to extend the permit beyond its due date of 10 February 1938 (C. G. Abbott file, SDNHM Archives, box 186). The operations seemed to resume, however, in November 1938 (Abbott, 1939), but ceased some time thereafter.

In addition to this commercial hunt, crew members of recreational U.S. fishing vessels often killed sea lions upon sight, as they were considered competitors (Abbott, 1939). One such killing on Islas Coronado, reported in a letter to the *San Diego Union* (13 July 1939), had dramatic effects on some spectators, but the number of sea lions killed in this context was probably not large.

In 1947 sea lions were still hunted on islands off the Pacific coast of Baja California for their skin and oil, but, according to the Mexican fishermen, the returns were less than the "damage" caused by them (Martínez, 1947). Similarly, commercial hunts for sea lions by U.S. companies along Baja California's Pacific coast were made from 1940 to as late as 1955, but high expenses made the activity unprofitable (Lluch-Belda, 1969). During the late 1950's, some sea lions were reportedly hunted for human consumption, and others were killed apparently by U.S. anglers along the Pacific coast of Baja California (Van Gelder, 1960). There was no apparent use of sea lions during the mid 1960's on the Pacific islands of Baja California (Rice et al., 1965), nor has there been any since then.

In the Sea of Cortés the story was different. During the 1930's, sea lion hunts were officially sanctioned and fluctuated with markets and other factors (Lluch-Belda, 1969). Around the 1930's, the Concaac hunted sea lions using both rocks and rifles (Malkin, 1962). Though the meat was used, the sale of the skins seems to have been the hunt's major purpose, as the Concaac survived in the early 20th century apparently by adopting commercial harvesting of resources, including also that of sharks and other fishes (Spicer, 1978). Interestingly, the ending of sea lion hunting by the Concaac might have resulted from the reduction in the skin market (Malkin 1962). Currently, the Concaac do not hunt sea lions.

In hunts by nonConcaac hunters, oil, meat, skin, and trimmings were used at first, but later only oil was extracted (Lluch-Belda, 1969, 1970). Sea lion meat and skins were not utilized after the 1940's, in part due to the closure of the tannery in Guaymas (Zavala-González, 1993). Altogether, oil was the major commodity obtained from sea lions, while the trimmings were the second most important product. Extraction of sea lion oil peaked in 1951 at 50 metric tons (Table 1), and was obtained at least until 1966, and possibly into the early 1970's. Most of the hunting was performed at Granito, San Pedro Nolasco, San Pedro Mártir, and some beaches of Ángel de la Guarda, notably Los Machos and Los Cantiles.

An important market for shark-liver oil developed after 1937 (Byers, 1940). This led to a shark long-line fishery along the west coast of Mexico, in which sea lions were used as bait. Also, sea lion oil was apparently used to dilute shark-liver oil. From the early 1980's to well into the 1990's, the shark fishery gained momentum in Mexico. Again, sea lions, notably pups, became a common, although illegal, bait (Bahre, 1983, and personal observ.).

In the early and mid 1970's some people, at least from Guaymas, killed sea lions to make jackets for their personal use (J. Mendoza[2]). In addition, even today members of some fishing crews shoot at sea lions, as they consider them a nuisance (Gallo-Reynoso, 1986).

Modern Hunts in the Sea of Cortés

The intent to regulate the harvest of sea lions and other marine mammals led to a formal procedure in the late 1960's in which 1-year permits were granted by the Dirección General de Pesca to kill adult sea lions. The permit holder was required to pay the expenses of a biologist to supervise the cull, comply with the hunting season (from 15 May to 15 July), kill no more than 50% of the adult males in the rookery, use the animals completely, and conduct censuses before and after the hunt. Compliance with the established season was the only rule not violated, and the cull, although restricted to adult males, always exceeded the 50% limit (Lluch-Belda, 1969).

From 10 to 12 sea lions were killed daily at any particular site, because that was the most that could be processed. Between 250 and 600 animals were killed per season, with 400 being a more realistic figure (Aurioles-Gamboa and Zavala-González, 1994). Between 1942 and 1964, the commercial sea lion hunts were almost exclusively made by Sonoran permittees, mostly based at Guaymas.

The hunting party was composed of a hunter, a renderer (the person that boiled the meat to render the fat), and 3 or 4 butchers. The hunt was mostly restricted to adult male sea lions, not only because that was the rule, but also because they produced more oil (Lluch-Belda, 1969).

A camp was established on the beach as close as possible to a rookery. Using stealth to avoid scaring sea gulls or sea lions, the team approached the rookery and shot a male sea lion, with a firearm, from 10–15 m away. As one of the butchers worked on the animal, the other proceeded with the hunt. The dead sea lion was skinned and the layer of subcutaneous fat was removed and taken to the campground, where it was rendered. The rest of the animal and the skin were left on the beach or thrown in the sea (Lluch-Belda, 1969). Although elephant seals are sometimes encountered in the Sea of Cortés, in addition to their being very rare, they were too large for the hunting teams to handle, and it is unlikely that they were ever

Table 1.—Mexican production of sea lion products from the Sea of Cortés.

	Production (kg)					
Product	1936[1]	1942[2]	1943[2]	1951[3]	1952[2]	1953[2]
Oil		16,245	31,674	50,000	15,430	22,049
Meat		149	15,000			
Trimmings		23	25		43	75
Skins	509	76				

[1] Boletín Forestal y de Caza y Pesca.
[2] Anuarios Estadísticos de Actividad Pesquera en Aguas Territoriales Mexicanas.
[3] Lluch-Belda (1969).

[2] Jorge Mendoza, Procudaría Federal de Protección al Ambiente, México, D.F. Personal commun., 1997.

included in the hunt. After a couple of weeks of hunting and rendering fat, the oil and trimmings were taken to port and shipped to their markets.

Concluding Remarks

In 1966 10,366 adult California sea lions were counted in the seven largest breeding rookeries in the Sea of Cortés. In 1991 the tally on the same rookeries was 17,486 (Zavala-González, 1993). This increase occurred despite the fact that some killing of sea lions happened throughout that period (indeed, albeit illegally, some killing has persisted to date).

The increase in numbers of sea lions since 1966 has resulted in increased interactions between them and fishermen. Sea lions are increasingly being entangled in fishing gear (Zavala-González and Mellink, 1997), and fishermen have started to complain about damage to their fishing gear; some also have requested that sea lions be culled to lower their numbers. At the same time there has been an emergence of environmental groups, some of which would clearly oppose any intent of culling the sea lions. Others would probably demand extensive and intensive studies that exceed the current abilities. In addition, some international organizations might also try to press the Mexican government in the direction of their own viewpoints or interests. So, it is forseable that in the near future some conflicts will emerge on the management of California sea lions in México.

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