PINNIPEDS

History

There are six pinniped species inhabiting the California coast and offshore islands: the California sea lion (*Zalophus californianus*), Steller (or northern) sea lion (*Eumetopias jubatus*), Pacific harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*) and Guadalupe fur seal (*Arctocephalus townsendi*). The ribbon seal (*Phoca fasciata*) and the hooded seal (*Cystophora cristata*) have been reported in California waters, but these were extremely rare events and they are not considered normal California visitors.

The California sea lion and Pacific harbor seal are probably the best known and most often seen pinnipeds in California waters. Californians and visitors from around the world enjoy watching the playful behavior of these animals cavorting in the water near shore or hauled out to rest on buoys, rocks and other solid objects. They also enjoy seeing them in public display aquaria or as performers in animal shows at zoos and parks. Pinnipeds are amusing and intelligent entertainers, but there is another aspect of the pinniped story which is related to their diet of fish and their expanding populations.

In recent years, California sea lions have gained notoriety by taking over portions of marinas in Monterey and San Francisco Bays and by eating endangered or threatened salmon and steelhead moving upstream to spawn. Marina operators and boat owners consider them a major nuisance, but revenue brought by tourists eager to see them has quieted many of their complaints. Some who fish commercially or for sport believe that pinnipeds compete for fish or are costly pests consuming tons of valuable fish, destroying valuable fishing gear and interfering with fishing operations. They complain that any sea lion is attracted to fishing operations and that the mere presence of a sea lion scares fish away from the fishing area. Research biologists speculate that most of those problems are caused by a relatively few "rogue" pinnipeds. Those rogues have learned that a fish caught in a net or hooked on a line is an easier meal than a free-swimming fish. A major concern is that this behavior will spread as the pinniped populations grow.

Faced with decreasing catches, increasing marine mammal populations and increasing fishery interactions, some sport and commercial fishers contend that sea lion populations have reached the point where nuisance animals should be exterminated. On the other hand, environmental groups and marine mammal aficionados support these animals and feel their populations should be allowed to increase unimpeded by human interests or needs.

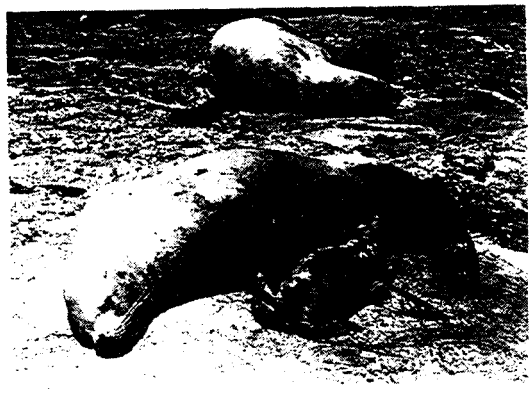
Food habit studies conclude that pinnipeds consume a variety of prey species, depending on availability, and that, contrary to claims made by many fishers, the normal pinniped diet does not usually include fish which are considered valuable for sport or sale. Their main diet consists of fish such as anchovies, mackerel, herring, hake, rockfish, salmon, and cephalopods such as squid and octopus. An example of their opportunistic feeding behavior was seen during the 1982-1983 El Niño event. Pelagic red crabs, usually not found in large numbers off California, were very abundant at that time, and were found to be a major diet component for sea lions until ocean conditions returned to normal.

In the 1860's and 1870's, many pinnipeds were killed for their oil or body parts and many females (cows) were captured for displays or animal acts. Pinnipeds were hunted commercially until 1938, when California law gave them complete protection from hunting. Nevertheless, sport and commercial fishers were free to kill sea lions and harbor seals that were destroying gear or otherwise interfering with fishing operations. In 1972, the Marine Mammal Protection Act was passed prohibiting the take (pursuit, harassment, capture, or kill) of marine mammals except under special permitted conditions. Such conditions include research, public display, certain fishery interactions, or entanglement in fishing gear.

To determine the extent of the intentional and accidental kills in various fisheries, observers were placed aboard fishing vessels. Their observations, along with calculations of fishing effort, were used to estimate total numbers of marine mammals killed during fishing operations. In California waters, it was estimated that 2,000 to 4,000 California sea lions, fewer than 100 elephant seals and between 800 and 2,000 harbor seals were killed annually during the 1980-1990 period.

Research has been conducted on methods of reducing the impacts that pinnipeds have on certain fisheries. Taste aversion substances and acoustic harassment devices have been tested but have met with only moderate success. In most cases, the animals appear to acclimate to the deterrents, and sometimes have used the purported scare devices as "dinner bells" signifying active fishing boats and an easy food source.

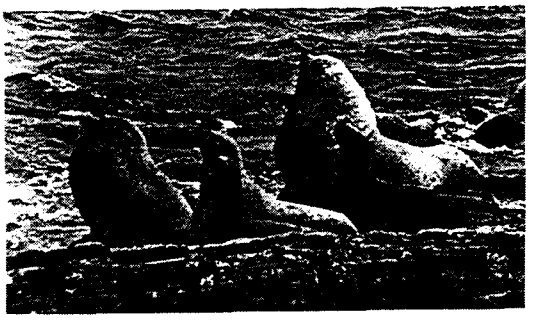
Status of Biological Knowledge



California sea lion, *Zalophus californianus*.

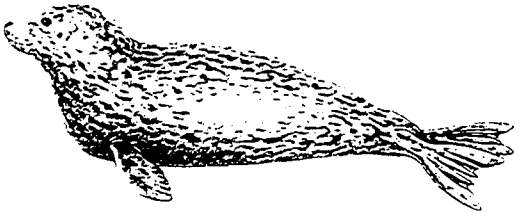
California sea lion. The California sea lion ranges from British Columbia south to Tres Marias Islands off Mexico.

Breeding grounds are mainly on offshore islands from the Channel Islands south into Mexico. Breeding takes place in June and early July within a few days after the females give birth. The pups are weaned at six months to a year or more. Males and females reach sexual maturity between four and five years of age. Males weigh between 500 and 1,000 pounds and reach seven to eight feet in length. Females weigh between 200 and 600 pounds and reach six feet. Adult males have a pronounced sagittal crest (a ridge on top of the skull extending from the forehead to the rear of the skull), a characteristic distinguishing this species from the Steller sea lion. Food of the California sea lion consists largely of squid, octopus, and a variety of fishes (anchovies, mackerel, herring, rockfish, hake, and salmon).



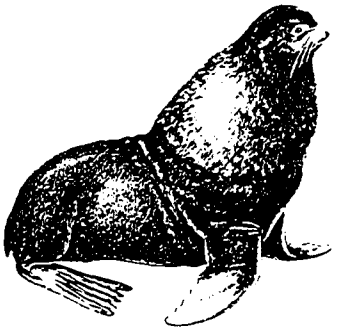
Steller sea lion, *Eumetopias jubatus*.

Steller sea lion. The Steller sea lion's distribution partially overlaps that of the California sea lion. It ranges from the Bering Strait off Alaska to southern California. Breeding grounds extend from the Pribilof Islands to the Channel Islands; however, only a small percentage breeds south of Año Nuevo Island. The largest breeding colonies in California are at Año Nuevo and the Farallon Islands. Breeding is in late June, after which the animals migrate northward. This species is a tawny or yellowish-brown color in contrast to the darker reddish color of the California sea lion. Males are 1,500 to 2,200 pounds and reach a length of 13 feet. Females can weigh a little over 600 pounds and reach a length of nine feet. Food of the Steller sea lion consists primarily of squid and fish. Because of recent declines in the population, Stellar sea lions have been designated as threatened under the Endangered Species Act.



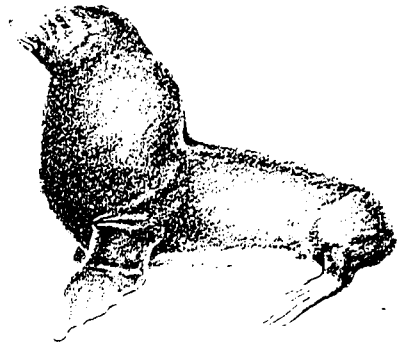
Pacific harbor seal, *Phoca vitulina*.

Pacific harbor seal. The Pacific harbor seal ranges along the northwest coast of America from the Gulf of Alaska to Cedros Island off Baja California. For management purposes, the U.S. harbor seal population has been divided into three stocks as follows: 1) Washington inner coastal waters, 2) Washington and Oregon outer coastal, and 3) California. In California, harbor seals are abundant along the entire coast. Adult male Pacific harbor seals reach a length of six feet and weight of up to 240 pounds, while females reach 5.5 feet and 275 pounds (when pregnant). The coloration patterns of adults vary from black with white spots to white with black spots. Breeding season varies with latitude, starting in April to May on the Channel Islands of southern California and continuing later up the coast. Age at sexual maturity is three to four years for females and five years for males. Newborn pups are approximately 32 inches in length and weigh about 22 pounds. They are weaned at five to six weeks at an average weight of 50 pounds. Adult females ovulate and mate at the end of weaning, with a two-month delayed implantation of the developing embryo. Their diet consists of fish such as flounders, herring, tomcod, hake, and lampreys, and cephalopods such as squid and octopus.



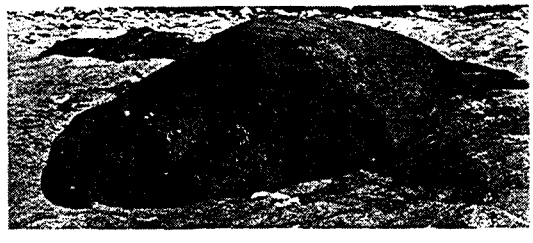
Northern fur seal, *Callorhinus ursinus*.

Northern fur seal. The northern fur seal is one of the best-known seals in the world because of its valuable fur, for which it was hunted to near extinction. Historical populations centered on the Pribilof Islands, Alaska, are estimated at two million animals, but in 1911, when international treaties were established to protect and manage this species, there were fewer than 125,000 animals. San Miguel Island, off Santa Barbara, California, hosts a small breeding colony and is the southernmost extent of its range. The peak breeding and pupping period is in July. After breeding, the males migrate out to sea where they spend as many as 10 months. The pups are weaned at four months of age and are left to travel in the northward migrations on their own. Fur seals are distinguished from sea lions by their pelage, composed of a very dense undercoat and a thinner, coarser layer of guard hairs, and by their relatively long flippers. The northern fur seal is closely related to the Guadalupe fur seal and is distinguished from its close relative by its very short muzzle. Males reach a length of eight feet and weigh up to 700 pounds. Females are only four to five feet in length and weigh about 130 pounds. Sexual maturity is attained between three and seven years of age, with longevity reported to be up to 26 years.



Guadalupe fur seal, *Arctocephalus townsendi*.

Guadalupe fur seal. The Guadalupe fur seal was presumed extinct until 1926, when a group of 60 animals was discovered on Guadalupe Island, Mexico. The population is recovering slowly from near extinction brought about by sealers in the last century. This is a rare pinniped in California waters, seen only occasionally at islands in the Southern California Bight. They breed only on Guadalupe Island and the total population is estimated to be less than 2,500 animals. They are identified by a "collie-like," long pointed muzzle. Males reach up to six feet in length; females are slightly smaller.



Northern elephant seal, *Mirounga angustirostris*.

Northern elephant seal. The comeback of the northern elephant seal, the largest of all the seals, is one of the great success stories for an animal threatened with extinction. Male elephant seals reach a length of 15 to 16 feet and weight of about 4,000 to 5,000 pounds. Females reach a length of 11 feet and weigh about 1,700 pounds. The male develops a bulbous enlargement of the snout from which, along with its size, it gets its common name. Breeding colonies exist on San Miguel Island, Santa Barbara Island, San Nicolas Island, Año Nuevo Island, Southeast Farallon Island, and Point Reyes Peninsula. They have also begun hauling out at several other mainland sites where historically they did not haul out. The breeding season is from December through March. Harems consist of one male and eight to 40 females. The gestation period is about 11.5 months. Pups are weaned by four weeks but remain on the rookery another eight to 10 weeks, sleeping during the day and gradually starting to enter the water at night. Departure from the rookery occurs at an age of approximately three months. Females begin breeding as young as two years of age. Males reach sexual maturity at five years; but older, larger males prevent young and socially immature males from mating until they are at least eight or nine years old. Males and females both live about 14 years.

Elephant seals do most of their feeding at night and probably in deep water as evidenced by the fact that they have been caught in nets at 2,000-foot depths. Time-depth recorder experiments show that elephant seals can dive to 5,200 feet, and stay beneath the surface for up to an hour. Stomach content analyses indicate that they feed on small sharks, rays, ratfish, rockfish, and squid.

Status of Populations

The Marine Mammal Protection Act recognizes marine mammals as components of the marine ecosystem and requires maintenance of stocks above levels at which they would lose their function in the ecosystem. In practice, marine mammal management is directed toward maintaining the optimum sustainable population size (OSP) for each species within its geographical range. To be optimal, the population size should be between the rate at which maximum growth occurs and the carrying capacity of the environment. A variety of procedures are used to asses population status.

California sea lion. California sea lions breeding on U.S. rookeries are assumed to comprise a single stock. Their status was last assessed in 1986. At that time, there were approximately 17,800 pups counted on U.S. rookeries, representing 21,000 births. That number of births would represent a total U.S. population (stock) size of about 87,000 animals. More recent unpublished data suggest that the population had grown to about 120,000 animals by 1991. The growth rate was assumed to be equal to that observed before the 1983 El Niño event, at which time the California sea lion population in the Southern California Bight was near the lower end of the OSP range.

Steller sea lion. Population estimates for northern sea lions are based on counts of animals hauled-out during the breeding season. A decline of this species is occurring throughout its range, including the Gulf of Alaska and Aleutian Islands, which support 75 percent of the world's population. The current west coast population of northern sea lions is around 68,000 animals, which is less than half of the population level during 1956-1960. The dramatic decline in numbers of Steller sea lion throughout most of its range has prompted its listing as threatened under the Endangered Species Act and depleted under the Marine Mammal Protection Act.

Pacific harbor seal. From aerial census data, the harbor seal population along the California coast appears to be increasing, and concurrently, the number of occupied sites has increased. In 1991, the mainland count was 18,346 seals, and the count for the eight Channel Islands was 4,743 seals, for a minimum population estimate of 23,089 seals in the California stock. This is a minimum population estimate because a substantial fraction of the population is not hauled out during the census.

The 1986 assessment did not confirm that the stock was large enough to fall within the range of OSP, but the counts since 1982 indicate that the rate of growth may be slowing. However,

the occurrence of the 1983-1984 El Niño and the possibility of increased incidental fishing mortality might have affected the population dynamics of this stock. It is likely that the survival and reproduction of harbor seals were altered during the El Niño period and that some of those effects persisted for several years. Additionally, fishing effort in the gill net fishery increased substantially during the 1970-1990 period and the resultant kill of harbor seals undoubtedly altered the population structure. Fishing effort in the gill net fishery is currently declining and should become less of a mortality factor for harbor seals.

Northern fur seal. In 1983, the estimated abundance was about 1.2 million. No significant changes have been documented since that time, although recent counts of Aleutian Island animals decreased. The adult count at San Miguel Island, the only place in California where the northern fur seal breeds, was around 4,000, which was a very small percentage of the worldwide population in 1984. Fur seals are occasionally taken incidentally in the high-seas gillnet fisheries for salmon and squid. They also entangle in discarded fishing debris and die. Although entanglement mortality is not known, there is evidence that it may be contributing to declining trends in the Pribilof Island population. That population has been designated as depleted under the Endangered Species Act and the Marine Mammal Protection Act. Further research on population assessment and trend analysis for the California Channel Island population is needed to determine its size and growth rates.

Guadalupe fur seal. The historical distribution and abundance of the Guadalupe fur seal are unknown because commercial sealers and other observers failed to distinguish between it and the northern fur seal in their records. This species, once thought to be extinct, has an estimated population of about 1,500 to 2,000 animals, with an annual pup production of approximately 200 pups. Although the primary breeding colony is on Guadalupe Island, recent sightings of adult and juvenile seals on some of the Channel Islands suggest that recolonization of that area may occur in the future. The Guadalupe fur seal is listed as threatened under the Endangered Species Act and depleted under the Marine Mammal Protection Act. These listings are based on the concept that the population could become endangered within the foreseeable future, even though it currently does not appear to be in danger of extinction. The population is being closely monitored.

Northern elephant seal. The exploitation and subsequent recovery of the northern elephant seal population is a remarkable story. Biologists estimate that only 100 to 500 animals were left on Guadalupe Island before protective legislation was passed. They claim that the entire current population may have originated from this small group of animals. Based on pup counts, the current U.S. population has grown to an estimated 80,000 animals, ranging from Alaska to Baja California. The apparent growth rate since 1980 has been about 8.75 percent annually. Annual surveys indicate that this species has reoccupied most or all of its historical rookeries and hauling grounds. Using data through 1986, the population appears to be within the OSP. Presumably, the increased size of the population may lead to increased interactions with fisheries and other human activities.

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