

History

There are six pinniped species inhabiting the California coast and offshore islands: the California sea lion (*Zalophus californianus californianus*), Steller (or northern) sea lion (*Eumetopias jubatus*), Pacific harbor seal (*Phoca vitulina richardsi*), 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 and, to a lesser degree, Pacific harbor seals have gained notoriety by taking over portions of marinas, bathing beaches and by eating endangered or threatened salmon and steelhead moving upstream to spawn. Marina operators and boat owners consider them a major nuisance, and potentially dangerous. Some seals react aggressively when people approach. Some who fish commercially or for sport believe that pinnipeds compete for fish and 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. The rogues have learned that a fish caught in a net or hooked on a line is an easier meal than a free-swimming fish, and some actually target these fisheries on a regular basis. A major concern is that this behavior will spread as the pinniped populations grow.

Resolving pinniped conflicts with human activities is a controversial issue. Faced with decreasing catches, increasing marine mammal populations, and increasing fishery interactions, some sport and commercial fishermen contend that some pinniped populations have reached the point where population control and management efforts should be implemented. This would include the lethal removal of nuisance animals. Others will argue for protection of

pinnipeds in spite of the damage and economic losses they cause.

It is unclear whether foraging by pinnipeds is impacting the abundance of marine species harvested by man. Current research data are insufficient to answer this question. Ecological interactions between pinnipeds and fishery resources are complex and poorly understood. Food habits studies on California sea lions and Pacific harbor seals indicate a broad range of prey species are consumed. The opportunistic feeding nature of pinnipeds means food habits can change dramatically between areas and years in response to changes in the abundance of different prey species. Research in this area is difficult because of the great complexities of interactions. Though we do know their diets often include fish such as anchovies, mackerel, herring, hake, rockfish, salmon, and cephalopods, such as squid and octopus.

In the 1860s and 1870s, many pinnipeds were killed for their oil or body parts and many females 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 fishermen 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 by Congress prohibiting the take (pursuit, harassment, capture, or kill) of marine mammals except under special permitted conditions. The act was renewed and revised in 1994. From its inception, the act specified that marine mammals should be protected as functioning elements of the ecosystem. The 1994 amendments to the act established a new system to reduce the injuries and mortality of marine mammals involved incidentally in commercial fishing operations to insignificant levels approaching zero.

Research has been conducted in the past on methods of reducing the impacts that pinnipeds have on certain fisheries (e.g., various taste aversion substances and acoustic harassment devices), but with little success. In most cases, the animals appeared to acclimate to the deterrents, and sometimes used the purported scare devices as "dinner bells" signifying active fishing boats and an easy food source. Long-term solutions remain illusive.

Status of Biological Knowledge

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



California Sea Lion, *Zalophus californianus*
Credit: Phil Schuyler

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, although males normally do not achieve territorial status until age eight or nine. 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

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

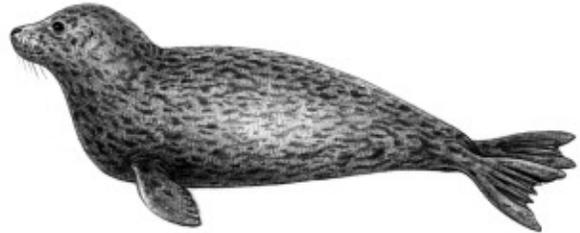


Steller Sea Lion, *Eumetopias jubatus*
Credit: Phil Schuyler

from the Pribilof Islands to Año Nuevo Island. The largest breeding colonies in California are at Point St. George, 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. Grown males are 1,500 to 2,200 pounds and reach a length of 13 feet. Females usually weigh between 600 and 900 pounds and reach a length of nine feet. Food of the Steller sea lion consists primarily of squid and fish.

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. 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,



Pacific Harbor Seal, *Phoca vitulina richardsi*
Credit: Phil Schuyler

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 March 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 long 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

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. It is a remnant of a much larger population that existed in California in the early 1800s. 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



Northern Fur Seal, *Callorhinus ursinus*
Credit: Phil Schuyler

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 long and weigh about 130 pounds. Sexual maturity is attained between three and seven years, with longevity reported to be up to 26 years.

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



Guadalupe Fur Seal, *Arctocephalus townsendi*
Credit: Phil Schuyler

only occasionally at islands in the Southern California Bight and the Farallon Islands. They breed only on Guadalupe Island. 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

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, San Simeon 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. Breeding groups, or "harems," consist of one male and eight to 40 females. The gestation



Northern Elephant Seal, *Mirounga angustirostris*
Credit: Phil Schuyler

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 the 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 assess population status.

California Sea Lion

California sea lions breeding on U.S. rookeries are assumed to comprise a single stock. The population of newborn pups is determined from an aerial census. The size of the entire population is estimated from the number of new births and the proportion of pups in the population. Their status was last assessed in 2000. At that time, the population size was estimated at 204,000 to 214,000 animals. Recent estimates place the population growth rate at 6.2 percent per year. Fishery mortality is increasing.

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 estimated at 39,031 animals, which is less than half of the population level from 1956 to 1960. The dramatic decline in numbers

of Steller sea lions throughout most of its range has prompted its listing as endangered 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. From the last aerial survey (1995), the population was estimated at 30,293 animals after using correction factors. The population appears to be growing and fishery mortality is declining.

Northern Fur Seal

The eastern North Pacific population of fur seals is estimated at over one million animals. The population at San Miguel Island was estimated in 1999 at 4,336 animals after correction factors. The San Miguel Island population has increased steadily since the 1970s. An annual increase of eight percent occurred from 1965 through 1996. However, the eastern North Pacific stock of fur seals is formally listed as depleted under the Marine Mammal Protection Act.

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 7,408 animals. The population is growing at approximately 13.7 percent per year. 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.

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 California breeding stock was estimated at 84,000 animals in 1996. The apparent growth rate since 1980 has been about eight percent annually. Annual surveys indicate that this species has reoccupied most or

all of its historical rookeries and hauling grounds. The population is continuing to grow and fishery mortality is relatively constant.

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