CALIFORNIA SEA LIONS

A SeaWorld Education Department Publication

CONTENTS

CALIFORNIA SEA LIONS

SCIENTIFIC CLASSIFICATION

A. Order—Pinnipedia.

Pinnipeds are seals, sea lions, and walruses. Some scientists classify pinnipeds as a suborder of the order Carnivora.

B. Family—Otariidae.

Otariids, also referred to as "eared seals," include all sea lions and fur seals. Otariids are characterized by having external ear pinnae (ear flaps) and long flippers.

C. Genus, species—*Zalophus californianus*.

1. The genus name *Zalophus* comes from the Greek *za*, a prefix expressing emphasis, and *lophos*, meaning "crest." It refers to the large crest on the skull of an adult male.

2. Most scientists recognize three geographically separated subspecies of the California sea lion: *Z.c. californianus*, *Z.c. wollebaeki*, and *Z.c. japonicus*. This information booklet concerns *Z.c. californianus* unless otherwise noted.

D. Fossil record.

The earliest otariids appear in the fossil record about 12 million years ago. The first *Zalophus* fossils date back to the late Pleistocene, about 120,000 to 220,000 years ago.

DISTRIBUTION AND HABITAT

A. Distribution.

1. *Z.c. californianus* is found along the coast of the eastern North Pacific, from southern British Columbia to western Mexico including Baja California. California sea lions breed on islands off the coasts of California and Baja California, including the Channel Islands, Guadalupe, San Benitos, and Cedros. They also breed on the coast and islands of the Gulf of California, and the Mexican Pacific coast as far south as Isla Tres Marias.

2. *Z.c. wollebaeki* is found mainly on the Galápagos Islands. Some are occasionally spotted off the coasts of Ecuador and Columbia

3. *Z.c. japonicus* was once found on a select few Japanese islands. Some researchers believe that there are individuals of this subspecies on Takeshima Islands (now claimed by South Korea). Most researchers believe this subspecies is extinct.

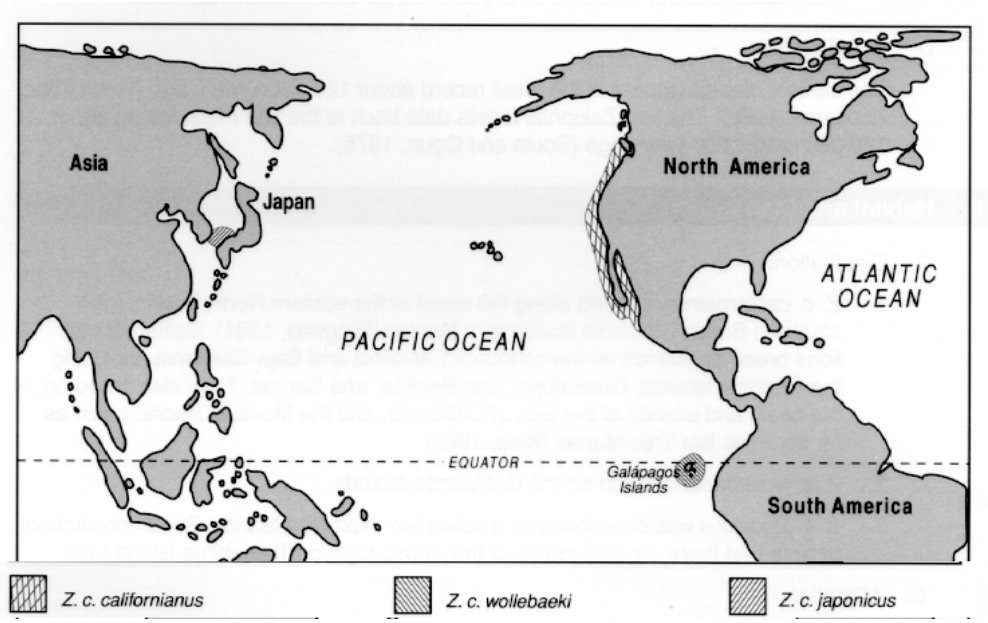
B. Habitat.

California sea lions inhabit rocky and sandy beaches of coastal islands and mainland shorelines. They may frequent sandbars; sheltered coves; tide pools; and structures such as piers, jetties, and buoys.

C. Migration.

1. During the nonbreeding months, most males migrate north from breeding grounds. Southern California males migrate to Puget Sound, Washington and British Columbia; males from Baja California migrate to the Channel Islands.

2. Most females either stay within their breeding grounds or move south during nonbreeding months.



D. Population.

1. The *Z.c. californianus* population is estimated at about 237,000 to 244,000.

   a. Studies have suggested that the California sea lion population in the United States has possibly increased at an average annual rate of 10.2% since 1983. The Mexico population has remained stable.

   b. One of the largest breeding rookeries is found on the Channel Islands. In 1990 the Channel Island population was estimated to be about 89,000 animals, based on a pup count of 25,000.

   c. California sea lions are not endangered or threatened.

2. The Galápagos population is estimated at 20,000 to 50,000. This population is listed by the IUCN as "Vulnerable".

3. The Japanese population was estimated in the 1950s to be 200 to 300, but is currently presumed by most researchers to be extinct.

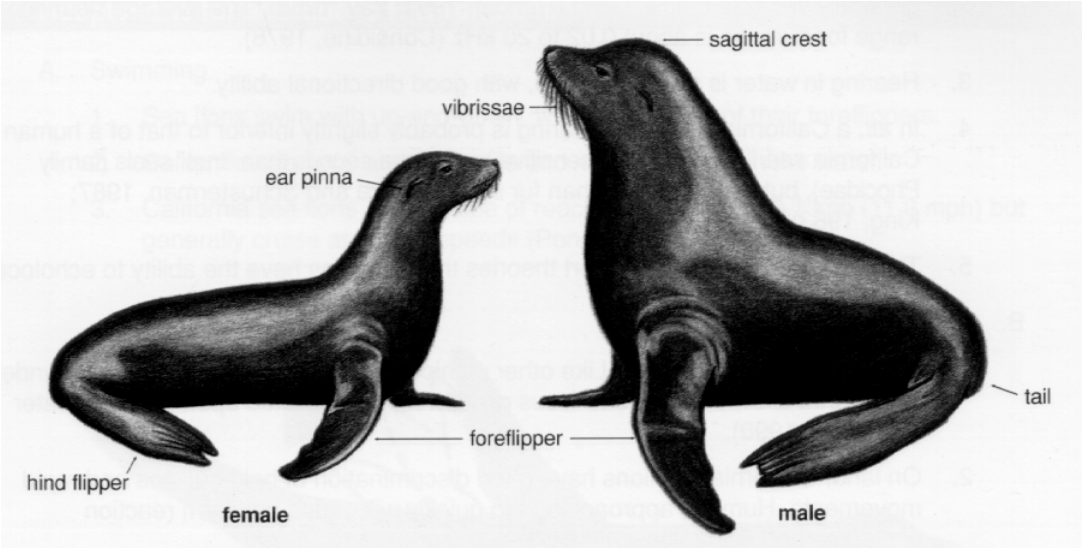
PHYSICAL CHARACTERISTICS

A. Size.

1. Male California sea lions reach about 2 to 2.5m (6.5–8 ft.) and 200 to 400 kg (440–880 lb.). At maturity male California sea lions are much larger than females.
2. Female California sea lions reach about 1.5 to 2 m (5–6.5 ft.) and 50 to 110 kg (110–240 lb.).

B. Body shape.

A California sea lion has a fusiform body shape that is sleek and streamlined.



C. Coloration.

1. California sea lion coat colors vary. Generally, adult males are chocolate brown, females and young males are tan, and pups are dark chocolate brown. As adult males age, the hair around their heads lightens to a light tan.
2. Most California sea lions appear dark brown to black when wet.

D. Foreflippers.

1. A California sea lion's foreflippers are large and winglike.
2. The foreflippers have all the major skeletal elements of the forelimbs of land mammals, but they are modified for swimming. The "arm" bones are shortened, and the flippers are lengthened by cartilaginous extensions at the tips of the finger bones.
3. The first digit is larger than the others. It's strengthened by fibrous tissue along the leading edge.
4. There are no claws or hair on the foreflippers.
5. California sea lions use their foreflippers in an up-and-down, winglike motion to propel themselves through the water.

E. Hind flippers.

1. Like land mammals, sea lions have five digits in the hind limbs. They are lengthened by cartilaginous extensions.
2. Nails are visible on the middle three digits.
3. On land, a sea lion can rotate its hind flippers underneath the pelvic girdle, enabling it to support its weight and walk on all fours.
4. In the water, a sea lion extends its hind flippers and uses them to help steer.

F. Head.

1. The California sea lion has visible ear pinnae (ear flaps) on either side of its head.
2. California sea lions have large eyes.
3. There are about 20 to 30 vibrissae (whiskers) on each side of the muzzle, a total of about 40–60. These tactile organs are well supplied with muscles and nerves.
4. California sea lions have 34 to 38 teeth: four large canine teeth, smaller incisors, and cone-shaped cheek teeth. The teeth are designed for grasping and tearing (not chewing) food. Deciduous teeth (milk teeth) are shed before birth.
5. When relaxed, the nostrils are closed. A sea lion voluntarily opens its nostrils by contracting its mystacial (cheek pad) muscles.
6. Adult male California sea lions have a raised forehead. This area of the skull is called the cranial, or *sagittal* crest. At about ten years, the male's sagittal crest reaches full size, up to 4 cm (1.5 in.). Females have a lower, smoother forehead.

G. Tail.

A California sea lion has a small, flattened tail between the hind flippers.

H. Hair.

1. A sea lion's coat consists of guard hairs with shorter fine underhairs. Each guard hair is associated with several underhairs. A thin film of oil secreted by glands under the skin waterproofs the coat.
2. California sea lions molt (shed their hair) once each year, gradually shedding and replacing most of the guard hairs and underhairs. This molt usually occurs after the breeding season.
    a. Immature and nonbreeding females molt in August and September.
    b. Lactating females and subadult males molt in September and October.
    c. Adult males molt from November to February.
3. On land, California sea lions groom their coats. One common grooming behavior is a doglike scratching using the nails of one of the hind flippers.

They also rub against rocks or other sea lions or rub their hair with their foreflippers.

SENSES

A. Hearing.

1. Hearing is one of the most important senses for a California sea lion.
2. Researchers believe that under water, a California sea lion can hear sounds in the range of 1 to 40kHz, with a peak sensitivity of 15 to 30 kHz. California sea lions generally vocalize between 1 to 4 kHz. The average hearing range for humans is about 0.02 to 20 kHz.
3. Hearing in water is probably acute, with good directional ability.
4. In air, a California sea lion's hearing is probably slightly inferior to that of a human. California sea lions are more sensitive to airborne sounds than "true" seals (family Phocidae), but less sensitive than fur seals.
5. There is no evidence to support theories that sea lions have the ability to echolocate.

B. Eyesight.

1. Underwater vision is acute. Like other pinnipeds, California sea lions have rounded lenses that allow their eyes to focus on light that is refracted upon entering water.
2. On land, California sea lions have good discrimination of bold outlines and rapid movements. Humans approaching too quickly will cause an alarm reaction.
3. A sea lion's eyes are very sensitive to changes in light intensities.
    a. The retina of the eye contains more light-gathering rod cells than cone cells, which discriminate color.
    b. California sea lions have a well-developed *tapetum lucidum,* a layer of reflecting plates behind the retina. These plates act as mirrors to reflect light back through the retina a second time, increasing the light-gathering ability of the rod cells. (The tapetum lucidum is the same structure that makes a cat's eyes appear to "glow" when reflecting light at night).
    c. In the water, a sea lion's eyes adapt easily to decreasing light levels; in the air, decreased light causes a dramatic decrease in visual acuity.
4. Recent studies show that sea lions can discriminate color in the blue-green spectrum; this is probably an adaptation for their aquatic environment.

C. Tactile.

1. California sea lions seek out physical contact with other sea lions. On land, California sea lions form groups, often touching and lying with each other.

2. A sea lion uses its sensitive vibrissae to explore objects on land and in the water. A nerve network transmits tactile information from the vibrissae to the brain.

D. Taste.

Researchers believe that a sea lion's sense of taste is poorly developed.

E. Smell.

The olfactory lobes of the pinniped brain are generally small; however, on land, smell is important in female-pup recognition and male recognition of estrous females. Sea lions may be able to detect a human by smell from hundreds of meters away.

ADAPTATIONS FOR AN AQUATIC ENVIRONMENT

A. Swimming.

1. Sea lions swim with up-and-down, wing-like strokes of their foreflippers.

2. California sea lions are very agile and maneuver well in the water.

3. California sea lions are probably capable of reaching speeds of 21.6 kph (13.4 mph), but generally cruise at slower speeds, about 7 kph (1.2 mph).

B. Diving.

1. California sea lions usually do not need to dive very deeply, since most of their food is found in shallow waters, about 26 to 74 m (85–243 ft.) deep. They can, however, dive to depths of about 274 m (899ft.).

2. California sea lions usually stay submerged three minutes or less; however, they can remain submerged for as long as 10 minutes.

3. Foraging trips for Galápagos sea lions have been estimated to last an average of 15.7 hours and entail 85 to 198 dives.

4. All marine mammals have special physiological adaptations for diving. These adaptations enable a California sea lion to conserve oxygen while it is under water.

   a. California sea lions, like marine mammals, have a slower heart rate while diving. A sea lion's heart rate can slow from about 95 to about 20 beats per minute.

   b. Sea lions have a higher blood volume than nondiving animals of comparable size. The increased volume allows greater oxygen-binding capacity. When diving, blood is shunted away from tissues tolerant of low oxygen levels to the heart and central nervous system.

   c. The muscle of California sea lions has a high content of the oxygen-binding protein myoglobin to help prevent muscle oxygen deficiency.

C. Respiration.

Like most other marine mammals, a California sea lion's typical respiration cycle is a short exhalation, a short inhalation, and a longer breath-holding (apnea) period. Each exhalation and inhalation lasts about a second. The breath-holding period can last from 12 seconds to 15 minutes.

D. Sleep.

On land, California sea lions exhibit a variety of sleeping postures. They commonly sleep on the beach with all four flippers tucked under the body or with the foreflippers tucked under but the hind flippers together and extended. They also commonly rest and sleep balanced upright with their heads thrown back, noses pointed upward.

E. Thermoregulation.

1. Heat loss in water is about 27 times faster than in air of the same temperature.
2. A California sea lion's core body temperature is about 37.5°C (99.5°F).
3. California sea lions deposit most of their body fat into a thick layer of blubber just under the skin. The blubber layer insulates the California sea lion and streamlines the body. It also functions as an excess energy reserve. This is especially important for males, because they fast during the breeding season.
4. Sea lions can lose excess body heat by staying in the water, on damp sand, or in the shade.
5. A sea lion often regulates its body temperature by lifting and exposing one or more flippers. The blood vessels just under the skin dilate and absorb or release heat to the environment.

BEHAVIOR

A. Social structure.

1. California sea lions do not have a stable social organization during the nonbreeding season (August through April).
2. California sea lions are extremely gregarious and form large aggregations when on land. Individuals lie close to each other, or even on top of each other.
3. Large male California sea lions exhibit size-related dominance over smaller animals.
4. When in the water, California sea lions often form small groups.
5. During the breeding season, California sea lions gather in rookeries for pupping and breeding.

B. Social behavior.

1. On land, sea lions aggregate in protected areas near shore.
2. In the water, they may form a *raft*: a small mass of sea lions on the surface in very close proximity.
3. Juvenile and nonbreeding California sea lions are perhaps the most playful of the otariids. They often ride the surf, chase each other, push and shove each other off rocks, and practice territorial battles. Adults engage in these activities less often.
4. In response to sudden or unusual activity (such as a loud noise or rapid movement), one or a few individuals start toward the water. This begins a rush as the rest of the herd follows. This alarm reaction is less pronounced during the breeding season.
5. Dominance behaviors are most aggressive during the breeding season. Males establish dominance by open-mouth threats and vocalizations, pushing, and shoving.

C. Territorial behavior.

1. Territorial behavior in males is strongly correlated to mating behavior. At the onset of the breeding season, male California sea lions establish breeding territories.
2. Dominant male California sea lions maintain territories from May through August, but territorial behavior is most intense between late June and early July. Galápagos sea lions maintain territories until January.
3. A male's territory extends beyond the water's edge and is partly aquatic. Various physiographic features (i.e. boulders, tide pools, reefs) serve as borders.

4. Boundaries are poorly defined and vary according to time of day, temperature, and movement of the females. Average size of a territory is about 130 square meters (1,400 square feet). Males are frequently observed along the beach at 10- to 15-m (33- to 49-ft.) intervals.

5. Males establish territories by incessant barking, chest-to-chest pushing, grappling, and biting. Fights may result in injury, but are rarely fatal.

6. Once territories are established, males patrol their boundaries and bark when necessary to maintain and defend them. An intruding male evokes and immediate response from the resident male, who struggles violently to displace the intruder. To reaffirm their borders males often engage in ritualized boundary displays. One such display is when two bordering males rush at each other, barking. When they reach the border they stop barking, fall on their chests, and, with mouths open, shake their heads from side to side. They then rear up and stare obliquely at each other. Bull also patrol the aquatic borders of their territories by swimming along the territories' edges.

7. Territories exist only when and where females are present. Females, however, are relatively indifferent to the territories and move about freely between them. Males make no attempts to herd females or prevent their departure.

D. Individual behavior.

1. California sea lions often rest and sleep on land and in the water.

2. A sea lion may raise a flipper out of the water to regulate its body temperature.

3. Sea lions often "porpoise"; that is, they leap out of the water while swimming and re-enter headfirst.

E. Interaction with other species.

1. California sea lions share haul-out space with northern elephant seals, harbor seals, northern fur seals, and Steller sea lions. California sea lions frequently interact with these species in much the same way as they interact among themselves.

2. California sea lions normally coexist peacefully with other marine mammal species, but breeding males, and females with newborn pups, may threaten and chase intruders. During breeding season, territorial disputes between male California sea lions and fur seals usually result in a victory for the more aggressive fur seal.

3. Pups and juveniles may snap at and briefly chase gulls.

COMMUNICATION

A. Sound production.

1. Sea lions have vocal cords.

2. A California sea lion's primary means of communication is vocalization. Sea lions produce sounds both above and below water.

3. California sea lions are among the most vocal of all mammals. Vocalizations include barks, growls, and grunts.

4. During the breeding season, male California sea lions bark incessantly when establishing territories; once established, the males bark only when maintaining and defending their territories.

5. During periods of nonbreeding, submissive males become more vocal than dominant males.

6. Females use a specific vocalization during the mother-pup recognition sequence. This occurs when a female returns to the rookery after feeding to locate her pup. The female emits a loud trumpeting vocalization, which elicits a bleating response from her pup. This exchange continues until mother and pup find each other. Mother and pup also recognize each other by smell and sight.

7. Females become very aggressive immediately before and after giving birth. Their "threat vocals" progress from a bark to an intense squeal to a more forceful belch and finally to an irregular growl.

8. Pups make a bleating mother-pup recognition call and a high-pitched alarm call. They later develop an adult-like bark.

B. Display behavior.

1. Sea lions communicate visually, with postural displays.

2. When maintaining breeding territories male sea lions communicate by using a number of postural displays.

FOOD AND FORAGING

A. Food preferences and resources.

1. California sea lions are predators that obtain all their food from the sea. They feed on more than 50 species of fishes and cephalopods, feeding primarily on squids, octopuses, hake, northern anchovy, opaleye, and herring.

2. They are opportunistic predators of salmon, lamprey, and some bottom-dwelling fishes. California sea lions on the Washington coast often take advantage of the winter run of steelhead salmon; the sea lions wait by the mouth of the Lake Washington drainage and consume large quantities of the salmon.

B. Food intake.

Based on records of animals at SeaWorld, adult California sea lions eat about 5% to 8% of their body weight per day (6.8–18.2 kg, or 15–40 lb.).

C. Methods of collecting and eating food.

1. A Galápagos sea lion may spend an average of 15.7 hours foraging at sea. A foraging trip may entail 85 to 198 dives.

2. A sea lion may use its sensitive vibrissae to explore and locate food.

3. California sea lions don't chew their food. They swallow it whole or tear it into chunks.

D. Water intake.

California sea lions generally obtain the water they need from their food. Most research indicates that California sea lions don't drink water, though males have been observed apparently drinking seawater while fasting.

E. Fasting.

During the breeding season, adult males fast when defending their territories. Leaving their territories to feed would necessitate re-establishing territorial boundaries and would result in lost mating opportunities. This fasting usually lasts a few weeks.

F. Swallowing stones.

Scientists have found stones in the stomachs of various species of sea lions, including California sea lions. One specimen was found to have 27.2 kg (60 lb.) of stones in its stomach. Experts don't know why sea lions swallow stones. Some theories include the following: adding extra weight for ballast while swimming, helping to stop irritation from intestinal parasites, and assisting in digestion. They may also swallow stones for no reason at all.

REPRODUCTION

A. Sexual maturity.

In zoological environments, successful mating has been observed in males as young as two years. In the wild, social factors greatly influence a male's breeding success. Males may not successfully reproduce until about nine years of age, when they attain full size and are able to compete for females.

B. Mating activity.

1. California sea lions tend to breed on the same section of beach year after year. Sea lions generally favor beaches on the windward side of islands.

2. California sea lion bulls establish breeding territories on the beach from May to August. The peak of mating activity is in late June and early July. Galápagos sea lions may mate from May to January.

3. A male with an established territory breeds with an average of 16 females in one season.

4. Female California sea lions come into estrus ("heat") about three to four weeks after giving birth. Studies show that mating generally takes place about 20 to 30 days after giving birth.

5. Females initiate courtship and copulation by displaying submissive postures in front of the male. They rarely breed more than once in a single season.

6. Copulation has been observed on land, and in shallow and deep water.

7. Courtship and copulation may last from a few minutes to a few hours. The female terminates copulation by raising her head and shoulders and biting the male's neck.

BIRTH AND CARE OF YOUNG

A. Gestation.

1. Total gestation lasts 11 to 11.5 months.
2. Scientists are reasonably certain that California sea lions have delayed implantation: when the fertilized egg divides into a hollow ball of cells one layer thick (blastocyst) it stops growing and floats freely in the uterus for about three months. The blastocyst then implants in the uterine wall and continues to develop. A study of California sea lions in zoological habitats showed that blastocyst implantation appears to be triggered by day length. Delayed implantation assures that the pup will be born when environmental conditions are optimal for its survival.

B. Pupping (birth) season.

Most California sea lion pups are born in June. Galápagos sea lion pups are born throughout most of the year, probably because of the year-round warm, tropical climate. Peak season is late May to January.

C. Frequency of birth.

Females generally give birth to one pup each year. Multiple births have never been observed in the wild. In zoological habitats, however, twins have been documented.

D. Pupping.

1. Pups are born on land.
2. Pupping may last from a few minutes to an hour. Approximately 63% of pups are delivered head-first.
3. The female vocalizes often during and immediately after the birth of her pup. The pup instinctively replies. This vocal interaction may continue for 20 minutes or more. This helps establish the mother-pup bond. The female may also smell, nuzzle, pull, and nip at her pup.

E. Pup at birth.

1. Pups are about 75 cm (29.6 in.) and 6 kg (13.2 lb.).
2. Pups are dark chocolate brown to black at birth. They undergo two molts in the first six months.
3. Pups are well developed at birth. They are born with their eyes open and can vocalize. Within 30 minutes they are able to shake, groom, scratch, and walk. Pups appear to be able to swim at birth, although their movements are not well coordinated.

F. Care of young.

1. Nursing.

   a. All sea lions employ a *foraging strategy* when nursing. After a few days with her newborn pup, the mother leaves the pup alone while she forages at sea. Having replenished her energy reserves, she returns and nurses her pup again. As the pup grows she leaves for progressively longer foraging trips.

   b. Pups suck vigorously and can actually be heard several meters away.

   c. For the first two months of nursing a new pup, a mother sea lion's milk contains 32% fat, about 9% protein, and 0.6% lactose (milk sugar). By the fourth month of nursing, the fat content may increase to 44%. The protein and lactose remain relatively constant.

   d. Nursing normally continues for six to twelve months, although females have frequently been observed nursing yearlings. These findings are compatible with observations of California sea lions in zoological habitats. Some Galápagos sea lions have been documented nursing as long as three years.

   e. In addition to nursing, pups begin eating fish at about two months.

   f. Under most circumstances, a female will nurse only her own pup. Fostering behavior has been observed, but is not as common as in some other pinnipeds.

2. Female-pup interactions.

   a. A female is very protective of her pup for the first two to four days. Aggressive, almost territorial displays and open-mouth threats to other females are common.

   b. Female and pup recognize each other through a series of standard behaviors. As soon as a female returns to the rookery from foraging she vocalizes repeatedly. More than one pup may respond, so she makes her final identification by smelling her own pup. Vocal cues may be the most important factor in mother-pup recognition. A recent study found that a female will leave her pup to move toward a taped *recording* of her pup's vocals.

3. Researchers have observed Galápagos sea lions grooming their pups. Grooming has not been observed in the California subspecies.

G. Pup growth and development.

1. Pups learn by mimicking adult behavior.

2. Pups begin to group together at two to three weeks of age. Pups develop vocal, social, and swimming skills by interacting with others in these groups. These social groups break up by the end of the breeding season when the adults leave the rookery.

3. Research on California sea lions in zoological habitats suggests that mothers and juveniles recognize each other after weaning and may continue to associate with each other.

LONGEVITY AND MORTALITY

A. Longevity.

1. California sea lions probably live an average of 15 to 25 years. California sea lions in zoological habitats have been known to live 30 or more years.

2. Pup mortality may be 10% to 15% during the first month. Pups may be abandoned, wash away from pupping areas during high seas, or become ill during their first year.

B. Aging studies.

As a California sea lion ages, it periodically produces growth layers of dental material. Age can estimated by examining the growth layers of dentine in the roots of the canine teeth.

C. Predators.

Predation is not a significant threat to healthy adult California sea lions. Killer whales and large sharks occasionally prey on weaker California sea lions. A Steller sea lion bull was recently observed preying on a California sea lion pup.

D. Human impact.

1. Historical.

More than 7,000 years ago, California sea lions were hunted by the Chumash and Nicoleño Indians on the Channel Islands for subsistence. In the late 1800s they were hunted commercially for their hides. The impact of harvesting on sea lion populations has never been clear; it may have caused a slight decline.

In 1899 the United States Fish and Game Commission concluded that California sea lions were *too* numerous, and several thousand were killed intentionally for bounties. Killing sea lions in the Santa Barbara Channel was banned in 1909, but indiscriminate killing continued.

2. California sea lions continue to be shot by fishermen over competition for fish, particularly salmon. California sea lions often are seen in salmon spawning grounds, but in some cases, eat more lampreys than salmon. Lampreys (a type of fish) are parasites of salmon.

3. Pesticides and heavy metals in the ocean may impact sea lions. In one study, the tissues of females that had aborted pups had much higher concentrations of DDT than females who carried their pups to term.

4. Marine debris is a threat to sea lions. They can become entangled in nylon fishing nets or plastic packaging materials, causing severe injury or drowning. Sea lions also ingest plastic debris, which can cause obstructions in the digestive tract.

E. Disease and parasitism.

1. California sea lions are susceptible to gastric disorders, viral, and bacterial infections. Leptospirosis is a type of bacterial infection commonly found in

California sea lions. Leptospirosis primarily attacks the kidneys and can lead to permanent kidney damage, kidney failure, and even death.

2. California sea lions are host to a variety of parasites. Internal parasites include those that infect the respiratory tract, heart, liver, and stomach. One such parasite, the lungworm, *Parafilaroides decorus*, is ingested by sea lions when they feed on opaleye, a host fish for the lungworm. External parasites include lice, mites, and ticks.

F. El Niño.

In 1982, 1993, and 1998 marked declines in sea lion numbers was attributed to El Niño events. This cyclic event is characterized by a number of atmospheric changes, including an unusually warm current that prevents the upwelling of nutrient-rich cold water and causes fish populations to shift. A 25% to 35% decline in birth weights in the Channel Islands during this time was also traced to El Niño, which caused poor nutrition in pregnant and nursing females.

G. Domoic acid toxicity

Domoic acid is a naturally occurring toxin produced during harmful algae blooms (red tides) by phytoplankton of the genus *Pseudonitzchia*. Sea lions and other marine mammals develop neurological problems and even die after consuming anchovies, sardines, and shellfish containing this biotoxin. Since the late 1990s, hundreds of sea lions have stranded due to domoic acid poisoning.

CONSERVATION

A. Bans on hunting.

In Canada, the federal Fisheries Act has prohibited the killing of California sea lions since 1970.

B. California sea lion/salmon conflict.

California sea lions on the coast of Seattle, Washington prey on a declining population of winter steelhead salmon that return to the Lake Washington drainage to spawn each winter. Government agencies, in an attempt to prevent shootings of sea lions, have employed a number of harmless techniques to discourage this predation. These techniques include a high-decibel "acoustic barrier": loud sounds intended to deter sea lions from entering spawning grounds. So far, efforts to abate the sea lions have been inconclusive.

C. The U.S. Marine Mammal Protection Act (MMPA).

1. The U.S. Marine Mammal Protection Act (MMPA) of 1972 made it illegal to hunt or harass any marine mammal in U.S. waters.

2. The MMPA does allow for certain exceptions: native subsistence hunting; collecting or temporarily restraining marine mammals for research, education, and public display; and taking restricted numbers of marine mammals incidentally in the course of fishing operations.

3. The primary objective of the MMPA is to maintain the health and stability of the marine ecosystem and to obtain and maintain an optimum sustainable population of marine mammals.

3. According to the MMPA, all seals and sea lions in U.S. waters are under the jurisdiction of the National Marine Fisheries Service.

D. Status

1. The Galápagos sea lion is listed as vulnerable by the IUCN.

2. The Japanese sea lion is listed as extinct by the IUCN.

E. Marine zoological parks.

1. Zoological institutions rescue, treat, shelter, and release California sea lions that have become stranded due to illness, injury, or abandonment. SeaWorld San Diego is part of the Marine Mammal Stranding Network under the National Marine Fisheries Service, and is responsible for rescuing, treating and releasing hundreds of injured, ill or orphaned California Sea lions in addition to other stranded marine animals at its state-of-the-art rescue and rehabilitation facility.

2. Having California sea lions at marine zoological parks provides the opportunity for the public to learn about these animals and how human activities may impact their survival.

3. In the protected environment of a marine zoological park, scientists can examine aspects of California sea lion biology that are difficult or impossible to study in the wild.