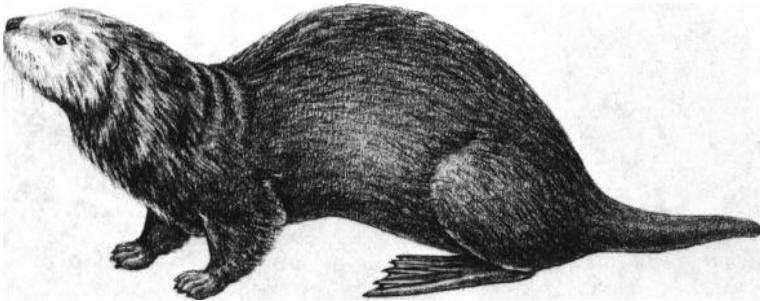


SEA OTTER

Enhydra lutris



Although California sea otters are very rarely seen out of the water, this one is shown in a standing position, to depict its body configuration better.

Biologists and others interested in animals were excited by the news in 1938 that a large herd of sea otters, variously reported at from 50 to about 90, had been discovered off Bixby Creek, 15 miles south of Monterey. But their existence along the Monterey County coast was not news to everyone. From about 1911, when the population reached a low point and they were feared nearly extinct, there had been occasional sightings, and several reports had been published in *California Fish and Game*. Ranchers and lighthouse keepers, park rangers, local wardens and other Fish and Game personnel knew of their existence and took an interest in them. However, because of the danger from poachers, their presence was not given much publicity.

In the summer of 1937, Highway 1, otherwise known as the Carmel-San Simeon Highway, was opened, making available to the general public a long stretch of rugged coastline hitherto almost inaccessible. It was inevitable that sooner or later the public would spot the sea otters. The opening of the highway also made it possible to study their habits and make more accurate counts of numbers and distribution.

The sea otter is one of the most interesting of all California mammals. It is a member of the weasel family, and is most closely related to the river otter. It is a large animal. In California the male reaches a length of about 4-1/2 feet and occasionally more (including a 10- to 12-inch tail) and a weight of up to 87 pounds. The female reaches a length of up to 4 feet and a weight up to 60 pounds. Otters have stubby, rounded forepaws, with not very well-developed fingers, and partially retractable claws. However, they are able to make considerable use of their paws for capturing food, for wielding rocks to puncture holes in abalones to remove them from the substrate and for hammering hard-shelled food items upon a rock positioned on their chests. The hind feet are large and webbed, with the fifth digit (comparable to man's little toe) the longest. The hind feet are used for propulsion, and the tail is used as an aid in swimming. When resting or swimming leisurely, the most common position is on the back, but when in a hurry, the otter will swim on its belly at speeds up to 5 miles per hour. Under extreme stress, the escape behavior is to swim underwater for long distances, coming to the surface briefly for air. The longest dive recorded was 4.5 minutes.

The most notable feature of the sea otter is its fur, which is unusually fine, soft and dense. In color it ranges from nearly black to reddish brown; the head and neck are paler on older animals. White-headedness is often associated with males and aging, but some females and young of both sexes may have white heads. It was the great value of its fur which almost led to its undoing. The original range of the species was from the northern islands of Japan north along the Kuril Islands and Kamchatka coastline, throughout the Aleutian and Pribilof Islands to the Alaskan mainland, thence south in a

continuous band into lower Baja California including all the offshore islands. The aboriginal inhabitants throughout the pristine range hunted the otter for its fur and for food. In many areas the fur was worn only by those of high social status. Aboriginal hunting methods in some areas were quite efficient, utilizing tangle nets, supported by wooden floats carved in the shape of a sea otter, and spears and arrows. The most proficient of the otter hunters were the Aleuts in Alaska, the Haida of the Queen Charlotte Islands and the Nootka and Kwakiutl of Vancouver Island and the Georgia Strait. In some areas hunting was so efficient the natives kept the otter populations at low levels enabling the Indians to gather quantities of large shellfish for consumption.

In 1741 Vitus Bering, from whom the Bering Sea took its name, discovered sea otters in the Commander Islands and eastward in the Aleutians. These explorers, accompanied by the German naturalist, Georg Wilhelm Steller, obtained about 800 pelts from the natives, thus starting the sea otter fur trade which eventually was to subject the north Pacific coastline and islands to exploration and occupation by several nations. In 1778 the English explorer James Cook explored the area from Vancouver Island to the Kamchatka Peninsula and revealed to the Western World the presence of a potentially vast source of profit in sea otter furs. The Russians hunted sea otters across the north; then, as they became scarce there, continued on south into central California, employing efficient Aleut hunters. In 1812 the Russians established Fort Ross in Sonoma County as a base, then hunting camps at Bodega Bay and the Farallon Islands. The Spanish passed legislation to keep nationals of other countries from hunting in their waters but were unable to enforce it except to refuse to supply hunting vessels. The Americans, and to a much lesser extent the British and French, began hunting otters after 1785. The hunt was exceptionally heavy from about 1830 to 1845, but by 1850 the trade in California was nearing an end; only a few scattered otters were taken from then until 1911. Near the end of the hunting (about 1850), the Russians, realizing the value of a controlled take, imposed restrictions in Alaska, then known as Russian America. However, the sea otter population in Alaskan waters was due for another slaughter when the Americans purchased Alaska in 1867. Within a 30-year period 100,343 pelts were taken despite a flood of letters and petitions urging protection of both the fur seal and the seaotter. Finally, in 1911 an agreement known as the Fur Seal Treaty was reached by the United States, Russia, Japan, and Great Britain. This protected sea otters on the high seas (outside the three-mile limit) from citizens of the four-signatory nations. In 1913 the territory of Alaska and the State of California enacted legislation for total protection of sea otters inside the 3-mile limit, where nearly all the otters are located. The remnant populations at that time were at Cedros Island, Baja California; at Big Sur and possibly Santa Catalina Island in California; at the Queen Charlotte Islands, British Columbia; at Prince William Sound, Kodiak Island and several places in the Aleutian Islands, Alaska; the Commander Islands, Russian; and the Kuril Islands, Japan. By 1920, however, the only remnant population south of Prince William Sound was at Pt. Sur.

An estimate of the number of sea otter pelts taken over the years is uncertain because of the illicit nature of much of the trade in California and Baja California, but there may have been 600,000 to 800,000 taken in the Pacific northwest and as many as 200,000 from California and Baja California waters during 170 years of hunting. That is not to say that the pre-hunting population in California and Baja California was anywhere near 200,000 sea otters. Much of the initial hunting probably consisted of cropping animals that otherwise would have died from natural causes, thus a viable stock was left for many years. It was the heavy take of otters by guns after 1830 that rapidly diminished the stocks leaving little recruitment to keep the population viable. Based upon present sea otter densities along part of the California coastline, the maximum population that may have been in California at the beginning of the fur trade is estimated at around 16,000 animals. The prices for pelts varied by fur quality and market conditions, with individual pelts occasionally selling for as little as \$8 and as much as \$1,703. The Alaskan government harvested around 2,000 sea otters in the late 1960s and received an average of \$80 per pelt. A color-matched set of four pelts brought \$2,300.

The 1978 range of the sea otter in California was from Santa Cruz, Santa Cruz County, south to Avila, San Luis Obispo County, a distance of about 200 miles. The population has been expanding about 2.5 miles per year since 1913 and has increased in numbers about 5% annually. At this time there are around 2,000 sea otters in California, from 105,000 to 140,000 in Alaskan waters, and about 10,000 in Russian waters. The latest thorough taxonomic work on the sea otter places the California and Alaskan populations in the same subspecies, *E. lutris lutris*, and considers the population in the Kurils as *E.l. gracilis*. Considering that sea otters have been along the north Pacific coast for at least 3 million years, there must have been considerable gene flow throughout their range for there to be so little difference between Californian and Alaskan animals in structure and behavior. Obviously there were long-distant wanderings then as are now observed in the California population, even though most individuals in an established population remain within a small home territory.

The California population is limited in size by food supplies in the established portion of its range, but the otter can still increase in numbers and expand its range by chance wandering to the edges of the range where food is not the limiting factor. The concentrations of animals at the northern and southern boundaries of the range are mostly young males, but some older males and a few young females also are present. This aggregation of animals is called the migrant front. When the migrant front moves into new foraging grounds, the invertebrates on which the otters feed are soon reduced to low levels and the front must move onward. There appears to be a strong sense of territoriality among sea otters, and many will remain in either the established population area or in the front area until starvation presses them to find new food supplies. Since most migrant front animals are either immature or old males, it appears that these animals cannot compete with larger more dominant males in the center of the range and must find the edge where there is plenty of food or die. When a migrant front moves into the next food-rich foraging area, dominant males and females with pups, along with immature animals of both sexes, occupy the abandoned area, but at a much lower density. Tagging studies reveal that at least some of the animals in the migrant front return to the established range and settle down. Some sea otters have wandered more than 200 miles ahead of the migrant front, but these animals rarely remained in one place for more than a few weeks. The established range of the otter is considered to be the area between migrant fronts and does not include the wanderers ahead of the front.

One of the more interesting aspects of the California population has been the sighting of animals far from what is considered their established range. There are reliable reports of sea otters being sighted from northern California to the Mexican border in the past 20 years, and there have been many unconfirmed sightings from the Channel Islands and along the southern and northern California coastline. Some of these sightings have proved to be harbor seals which on occasions may rest in thick kelp with only their heads showing, thus resembling sea otters. On the north coast, river otters have been seen entering the ocean near river mouths and actually foraging on crabs near kelp beds.

For many years it was believed sea otters had to live in kelp beds where they drape kelp fronds over their bodies and rest. Wherever kelp, especially *Macrosystis*, is present, otters will rest and forage among the fronds for snails and crabs. However in 1973 both the southern and northern migrant fronts moved into sandy beach areas: Monterey Bay in the north and Estero Bay in the south. These animals remained along the beaches day and night foraging almost entirely on Pismo clams. They did not raft in kelp canopies.

When otters of the migrant front move into a new area, they forage primarily on abalones, sea urchins and large crabs if the area is rocky and on clams and crabs if the area is sandy. Once most of the abalones and urchins are removed from the rocky areas, the front moves on. The diet of the animals which settle down in rocky areas succeeding the migrant consists of only around 10% abalones and urchins. The bulk of the diet in an established area is made up of crabs, but more than 40 other invertebrates are also taken, including snails, mussels, squid, octopus, chitons, tubeworms, limpets, barnacles, scallops, and even starfish. In sandy areas, Pismo clams, gaper clams, razor clams, mole

crabs, Dungeness crabs and other *Cancer* crabs are the forage items. Fish rarely appear in the diet of California sea otters.

The sea otter has no blubber as do seals and sea lions, and since the fur is not exceptionally efficient in maintaining its body temperature of 100°F, it has a high metabolic rate and must consume large quantities of food daily. The daily consumption of food ranges from about 35% of body weight for a young animal to 15% for a large adult male. The average for a medium-sized adult is about 25% of body weight. This consumption of invertebrate biomass amounts to about 2.5 tons per animal per-year, meaning that about 5,000 tons of food are consumed each year by the present California sea otter population.

Because of the efficiency of foraging (both daytime and nighttime) and the large volume of shellfish taken, the recovery of the sea otter is no longer endangered and it is now an enjoyable and entertaining part of the marine fauna. On the other hand, the shellfish resources that expanded after the otter virtually disappeared are now in danger of being greatly reduced should the otter be allowed to reoccupy the entire coastline of California. The otter, of course, does not eliminate shellfish populations, but it does forage on many species and reduces them to levels well below those exploitable by recreational and commercial users. Fisheries that likely will be greatly reduced should the otter be allowed to reoccupy its original range are the Pismo clam, recreational and commercial abalone fisheries, the sea urchin fishery and the shallow water red and rock crab fisheries. Fisheries that may be seriously jeopardized are the Dungeness crab, lobster, razor clam and all exposed mariculture projects.

Sea otters may live up to 20 years and have one young every two years or possibly sooner. Breeding and pupping occur throughout the year but pupping peaks from February to June. The mother cares for her young for at least six months and possibly a year. Births can take place either on land or at the sea's surface.

Sea otters usually dive in depths of 5 to 120 feet which are the depths they must go for most of their food. However, an Alaskan otter was taken from a king crab pot that was resting on the bottom 318 feet deep. Both Alaskan and California otters will haul out on land next to the water's edge, but they do so more often in Alaska where there is a greater need to conserve heat. The California otter regularly uses tools such as a rock positioned on its chest upon which to break hard shells. In Alaska, where most of the food selection is smaller and can be broken with its teeth, this practice is not as evident. Amchitka otters relocated to Oregon regularly used tools to break large shellfish in their new habitat. Their high metabolic rate requires from two to five forage bouts per day. The sea otter formula is $I\frac{3}{2} C\frac{1}{1}, PM\frac{3}{3}, M\frac{1}{2} = 8/8$.

Sea otters are very adaptive. They can be extremely wary when harassed or quite tame and entertaining when treated kindly. They do well in captivity and can be seen at several oceanaria along the Pacific coast. They have no natural enemies in California except the white shark. There is an unverified report from the Kuril Islands of an otter being attacked by a killer whale. For a time it was thought that otters were being run over by boats near harbors, but it now appears that only one case of propeller damage can be documented. Nearly all of the trauma involving cutting of the fur and external damage has been caused by shark attacks. The teeth from white sharks have been taken from the bodies of 11 sea otters washed up on beaches. About 30 additional dead otters exhibited characteristic shark teeth patterns on the body. It is not known how many otters are being eaten by sharks, but the mortality can not be extreme because the California population is still increasing.

The best places to observe otters are along Highway 1 where the road dips low to the water adjacent to kelp beds. Some of these areas are along the Monterey Peninsula, especially Point Lobos State Reserve south of Carmel, at Big Creek, Limekiln Creek, and Jade Cove. Binoculars are a must, and if a spotting scope is used, chances of observing grooming behavior, especially the mother's care for a pup, are much improved. When the pup is very young, up to two months of age, it possesses a long woolly coat brownish hair. This thick fur prevents it from diving and it must remain at the surface while its mother dives and finds food for herself. The pup will reach for its mother as soon

as she surfaces, presenting a very touching mother-pup display. Often the pup will cry for its mother when the mother is foraging or if separated during stormy sea conditions. The cry can be heard for long distances.

It is a little difficult to spot the animals at first, especially if the otters are in bull kelp, *Nereocystis*, beds. The round, dark brown kelp floats may resemble an otter's head or body, but one soon learns to recognize them. As the swells come in, the bull kelp attached to the bottom usually is covered temporarily while the floating otters remain. Look for gulls. One or two usually accompany each otter to grab what scraps they can while the otter is feeding. Otters often are spotted rolling over and over, a very characteristic trick which is part of the feeding and a grooming routine that keep fur in prime condition and able to trap air bubbles.

A representative of the Department of Fish and Game or local animal protection agency should be notified if a sick, wounded or dead sea otter is sighted, or if a pup appears to have been abandoned by its mother. The animals should not be touched. It is against both state and federal law to possess even momentarily a live or dead sea otter.