

= Sea otter =

The sea otter (*Enhydra lutris*) is a marine mammal native to the coasts of the northern and eastern North Pacific Ocean . Adult sea otters typically weigh between 14 and 45 kg (31 and 99 lb) , making them the heaviest members of the weasel family , but among the smallest marine mammals . Unlike most marine mammals , the sea otter 's primary form of insulation is an exceptionally thick coat of fur , the densest in the animal kingdom . Although it can walk on land , the sea otter lives mostly in the ocean .

The sea otter inhabits offshore environments , where it dives to the sea floor to forage . It preys mostly on marine invertebrates such as sea urchins , various molluscs and crustaceans , and some species of fish . Its foraging and eating habits are noteworthy in several respects . First , its use of rocks to dislodge prey and to open shells makes it one of the few mammal species to use tools . In most of its range , it is a keystone species , controlling sea urchin populations which would otherwise inflict extensive damage to kelp forest ecosystems . Its diet includes prey species that are also valued by humans as food , leading to conflicts between sea otters and fisheries .

Sea otters , whose numbers were once estimated at 150 @, @ 000 ? 300 @, @ 000 , were hunted extensively for their fur between 1741 and 1911 , and the world population fell to 1 @, @ 000 ? 2 @, @ 000 individuals living in a fraction of their historic range . A subsequent international ban on hunting , conservation efforts , and reintroduction programs into previously populated areas have contributed to numbers rebounding , and the species now occupies about two @-@ thirds of its former range . The recovery of the sea otter is considered an important success in marine conservation , although populations in the Aleutian Islands and California have recently declined or have plateaued at depressed levels . For these reasons , the sea otter remains classified as an endangered species .

= = Taxonomy = =

The first scientific description of the sea otter is contained in the field notes of Georg Steller from 1751 , and the species was described by Linnaeus in his *Systema Naturae* of 1758 . Originally named *Lutra marina* , it underwent numerous name changes before being accepted as *Enhydra lutris* in 1922 . The generic name *Enhydra* , derives from the Ancient Greek *en* / ?? " in " and *hydra* / ??? " water " , meaning " in the water " , and the Latin word *lutris* , meaning " otter " .

The sea otter was formerly sometimes referred to as the " sea beaver " , being the marine fur @-@ bearer similar in commercial value to the terrestrial beaver . Rodents (of which the beaver is one) are not closely related to otters , which are carnivores . It is not to be confused with the marine otter , a rare otter species native to the southern west coast of South America . A number of other otter species , while predominantly living in fresh water , are commonly found in marine coastal habitats . The extinct sea mink of northeast North America is another mustelid that had adapted to a marine environment .

= = = Evolution = = =

The sea otter is the heaviest (the giant otter is longer , but significantly slimmer) member of the family *Mustelidae* , a diverse group that includes the 13 otter species and terrestrial animals such as weasels , badgers , and minks . It is unique among the mustelids in not making dens or burrows , in having no functional anal scent glands , and in being able to live its entire life without leaving the water . The only member of the genus *Enhydra* , the sea otter is so different from other mustelid species that , as recently as 1982 , some scientists believed it was more closely related to the earless seals . Genetic analysis indicates the sea otter and its closest extant relatives , which include the African speckle @-@ throated otter , European otter , African clawless otter and oriental small @-@ clawed otter , shared an ancestor approximately 5 million years ago (Mya) .

Fossil evidence indicates the *Enhydra* lineage became isolated in the North Pacific approximately 2 Mya , giving rise to the now @-@ extinct *Enhydra macrodonta* and the modern sea otter , *Enhydra*

lutris . The sea otter evolved initially in northern Hokkaido and Russia , and then spread east to the Aleutian Islands , mainland Alaska , and down the North American coast . In comparison to cetaceans , sirenians , and pinnipeds , which entered the water approximately 50 , 40 , and 20 Mya , respectively , the sea otter is a relative newcomer to a marine existence . In some respects , though , the sea otter is more fully adapted to water than pinnipeds , which must haul out on land or ice to give birth .

One related species has been described , *Enhydra reevei* , from the Pleistocene of East Anglia . The holotype , a lower carnassial , was in the Norwich Castle Museum but seems to be lost . Only one more specimen , an extremely worn lower carnassial , is known .

= = = Subspecies = = =

The three recognized subspecies , which vary in body size and in some skull and dental characteristics , are :

The reintroduction effort off the Oregon coast was not successful . However , reintroductions in 1969 and 1970 off the Washington coast were very successful and sea otters have been expanding their range since . They have now entered the Strait of Juan de Fuca and can be found almost as far east as Pillar Point . Individuals have even been seen in the San Juan Islands and northern Puget Sound .

= = Physical characteristics = =

The sea otter is one of the smallest marine mammal species , but it is the heaviest mustelid . Male sea otters usually weigh 22 to 45 kg (49 to 99 lb) and are 1 @. @ 2 to 1 @. @ 5 m (3 ft 11 in to 4 ft 11 in) in length , though specimens to 54 kg (119 lb) have been recorded . Females are smaller , weighing 14 to 33 kg (31 to 73 lb) and measuring 1 @. @ 0 to 1 @. @ 4 m (3 ft 3 in to 4 ft 7 in) in length . For its size , the male otter 's baculum is very large , massive and bent upwards , measuring 150 mm (5 @. @ 9 in) in length and 15 mm (0 @. @ 59 in) at the base .

Unlike most other marine mammals , the sea otter has no blubber and relies on its exceptionally thick fur to keep warm . With up to 150 @, @ 000 strands of hair per square centimeter (nearly one million per sq in) , its fur is the densest of any animal . The fur consists of long , waterproof guard hairs and short underfur ; the guard hairs keep the dense underfur layer dry . Cold water is kept completely away from the skin and heat loss is limited . The fur is thick year @-@ round , as it is shed and replaced gradually rather than in a distinct molting season . As the ability of the guard hairs to repel water depends on utmost cleanliness , the sea otter has the ability to reach and groom the fur on any part of its body , taking advantage of its loose skin and an unusually supple skeleton . The coloration of the pelage is usually deep brown with silver @-@ gray speckles , but it can range from yellowish or grayish brown to almost black . In adults , the head , throat , and chest are lighter in color than the rest of the body .

The sea otter displays numerous adaptations to its marine environment . The nostrils and small ears can close . The hind feet , which provide most of its propulsion in swimming , are long , broadly flattened , and fully webbed . The fifth digit on each hind foot is longest , facilitating swimming while on its back , but making walking difficult . The tail is fairly short , thick , slightly flattened , and muscular . The front paws are short with retractable claws , with tough pads on the palms that enable gripping slippery prey . The bones show osteosclerosis , increasing their density to reduce buoyancy .

The sea otter propels itself underwater by moving the rear end of its body , including its tail and hind feet , up and down , and is capable of speeds of up to 9 km / h (5 @. @ 6 mph) . When underwater , its body is long and streamlined , with the short forelimbs pressed closely against the chest . When at the surface , it usually floats on its back and moves by sculling its feet and tail from side to side . At rest , all four limbs can be folded onto the torso to conserve heat , whereas on particularly hot days , the hind feet may be held underwater for cooling . The sea otter 's body is highly buoyant because of its large lung capacity ? about 2 @. @ 5 times greater than that of similar

@-@ sized land mammals ? and the air trapped in its fur . The sea otter walks with a clumsy , rolling gait on land , and can run in a bounding motion .

Long , highly sensitive whiskers and front paws help the sea otter find prey by touch when waters are dark or murky . Researchers have noted when they approach in plain view , sea otters react more rapidly when the wind is blowing towards the animals , indicating the sense of smell is more important than sight as a warning sense . Other observations indicate the sea otter 's sense of sight is useful above and below the water , although not as good as that of seals . Its hearing is neither particularly acute nor poor .

An adult 's 32 teeth , particularly the molars , are flattened and rounded , designed to crush rather than cut food . Seals and sea otters are the only carnivores with two pairs of lower incisor teeth rather than three ; the adult dental formula is $3 \frac{1}{2} \frac{1}{2} \frac{3}{2} \frac{12}{2} \frac{1}{2} \frac{3}{2} \frac{2}{2}$

The sea otter has a metabolic rate two or three times that of comparatively sized terrestrial mammals . It must eat an estimated 25 to 38 % of its own body weight in food each day to burn the calories necessary to counteract the loss of heat due to the cold water environment . Its digestive efficiency is estimated at 80 to 85 % , and food is digested and passed in as little as three hours . Most of its need for water is met through food , although , in contrast to most other marine mammals , it also drinks seawater . Its relatively large kidneys enable it to derive fresh water from sea water and excrete concentrated urine .

A sea otter has two types of fur , the underfur and the guard hair . The shape of these different hair fibers connect to trap air between them . This allows them to maintain their body heat without the blubber other sea mammals use .

= = Behavior = =

The sea otter is diurnal . It has a period of foraging and eating in the morning , starting about an hour before sunrise , then rests or sleeps in mid @-@ day . Foraging resumes for a few hours in the afternoon and subsides before sunset , and a third foraging period may occur around midnight . Females with pups appear to be more inclined to feed at night . Observations of the amount of time a sea otter must spend each day foraging range from 24 to 60 % , apparently depending on the availability of food in the area .

Sea otters spend much of their time grooming , which consists of cleaning the fur , untangling knots , removing loose fur , rubbing the fur to squeeze out water and introduce air , and blowing air into the fur . To casual observers , it appears as if the animals are scratching , but they are not known to have lice or other parasites in the fur . When eating , sea otters roll in the water frequently , apparently to wash food scraps from their fur .

= = = Foraging = = =

The sea otter hunts in short dives , often to the sea floor . Although it can hold its breath for up to five minutes , its dives typically last about one minute and no more than four . It is the only marine animal capable of lifting and turning over rocks , which it often does with its front paws when searching for prey . The sea otter may also pluck snails and other organisms from kelp and dig deep into underwater mud for clams . It is the only marine mammal that catches fish with its forepaws rather than with its teeth .

Under each foreleg , the sea otter has a loose pouch of skin that extends across the chest . In this pouch (preferentially the left one) , the animal stores collected food to bring to the surface . This pouch also holds a rock , unique to the otter , that is used to break open shellfish and clams . There , the sea otter eats while floating on its back , using its forepaws to tear food apart and bring it to its mouth . It can chew and swallow small mussels with their shells , whereas large mussel shells may be twisted apart . It uses its lower incisor teeth to access the meat in shellfish . To eat large sea urchins , which are mostly covered with spines , the sea otter bites through the underside where the spines are shortest , and licks the soft contents out of the urchin 's shell .

The sea otter 's use of rocks when hunting and feeding makes it one of the few mammal species to

use tools . To open hard shells , it may pound its prey with both paws against a rock on its chest . To pry an abalone off its rock , it hammers the abalone shell using a large stone , with observed rates of 45 blows in 15 seconds . Releasing an abalone , which can cling to rock with a force equal to 4 @ , @ 000 times its own body weight , requires multiple dives .

= = = Social structure = = =

Although each adult and independent juvenile forages alone , sea otters tend to rest together in single @-@ sex groups called rafts . A raft typically contains 10 to 100 animals , with male rafts being larger than female ones . The largest raft ever seen contained over 2000 sea otters . To keep from drifting out to sea when resting and eating , sea otters may wrap themselves in kelp .

A male sea otter is most likely to mate if he maintains a breeding territory in an area that is also favored by females . As autumn is the peak breeding season in most areas , males typically defend their territory only from spring to autumn . During this time , males patrol the boundaries of their territories to exclude other males , although actual fighting is rare . Adult females move freely between male territories , where they outnumber adult males by an average of five to one . Males that do not have territories tend to congregate in large , male @-@ only groups , and swim through female areas when searching for a mate .

The species exhibits a variety of vocal behaviors . The cry of a pup is often compared to that of a seagull . Females coo when they are apparently content ; males may grunt instead . Distressed or frightened adults may whistle , hiss , or in extreme circumstances , scream .

Although sea otters can be playful and sociable , they are not considered to be truly social animals . They spend much time alone , and each adult can meet its own needs in terms of hunting , grooming , and defense .

= = = Reproduction and lifecycle = = =

Sea otters are polygynous : males have multiple female partners . However , temporary pair @-@ bonding occurs for a few days between a female in estrus and her mate . Mating takes place in the water and can be rough , the male biting the female on the muzzle ? which often leaves scars on the nose ? and sometimes holding her head under water .

Births occur year @-@ round , with peaks between May and June in northern populations and between January and March in southern populations . Gestation appears to vary from four to twelve months , as the species is capable of delayed implantation followed by four months of pregnancy . In California , sea otters usually breed every year , about twice as often as those in Alaska .

Birth usually takes place in the water and typically produces a single pup weighing 1 @. @ 4 to 2 @. @ 3 kg (3 to 5 lb) . Twins occur in 2 % of births ; however , usually only one pup survives . At birth , the eyes are open , ten teeth are visible , and the pup has a thick coat of baby fur . Mothers have been observed to lick and fluff a newborn for hours ; after grooming , the pup 's fur retains so much air , the pup floats like a cork and cannot dive . The fluffy baby fur is replaced by adult fur after about 13 weeks .

Nursing lasts six to eight months in Californian populations and four to twelve months in Alaska , with the mother beginning to offer bits of prey at one to two months . The milk from a sea otter 's two abdominal nipples is rich in fat and more similar to the milk of other marine mammals than to that of other mustelids . A pup , with guidance from its mother , practices swimming and diving for several weeks before it is able to reach the sea floor . Initially , the objects it retrieves are of little food value , such as brightly colored starfish and pebbles . Juveniles are typically independent at six to eight months , but a mother may be forced to abandon a pup if she cannot find enough food for it ; at the other extreme , a pup may nurse until it is almost adult size . Pup mortality is high , particularly during an individual 's first winter ? by one estimate , only 25 % of pups survive their first year . Pups born to experienced mothers have the highest survival rates .

Females perform all tasks of feeding and raising offspring , and have occasionally been observed caring for orphaned pups . Much has been written about the level of devotion of sea otter mothers

for their pups ? a mother gives her infant almost constant attention , cradling it on her chest away from the cold water and attentively grooming its fur . When foraging , she leaves her pup floating on the water , sometimes wrapped in kelp to keep it from floating away ; if the pup is not sleeping , it cries loudly until she returns . Mothers have been known to carry their pups for days after the pups ' deaths .

Females become sexually mature at around three or four years of age and males at around five ; however , males often do not successfully breed until a few years later . A captive male sired offspring at age 19 . In the wild , sea otters live to a maximum age of 23 years , with average lifespans of 10 ? 15 years for males and 15 ? 20 years for females . Several captive individuals have lived past 20 years , and a female at the Seattle Aquarium died at the age of 28 years . Sea otters in the wild often develop worn teeth , which may account for their apparently shorter lifespans .

There are several documented cases in which male sea otters have forcibly copulated with juvenile harbor seals , sometimes resulting in death .

The forced copulation does not stop with the baby harbor seals , however , as there are documented cases of sea otters raping other animals as well . For instance , a sea otter named " Whiskers " was observed luring a Husky , " Tuk " , into the water , killing it , and raping its dead body .

= = Population and distribution = =

Sea otters live in coastal waters 15 to 23 meters (50 to 75 ft) deep , and usually stay within a kilometer (? mi) of the shore . They are found most often in areas with protection from the most severe ocean winds , such as rocky coastlines , thick kelp forests , and barrier reefs . Although they are most strongly associated with rocky substrates , sea otters can also live in areas where the sea floor consists primarily of mud , sand , or silt . Their northern range is limited by ice , as sea otters can survive amidst drift ice but not land @-@ fast ice . Individuals generally occupy a home range a few kilometers long , and remain there year @-@ round .

The sea otter population is thought to have once been 150 @,@ 000 to 300 @,@ 000 , stretching in an arc across the North Pacific from northern Japan to the central Baja California Peninsula in Mexico . The fur trade that began in the 1740s reduced the sea otter 's numbers to an estimated 1 @,@ 000 to 2 @,@ 000 members in 13 colonies . In about two @-@ thirds of its former range , the species is at varying levels of recovery , with high population densities in some areas and threatened populations in others . Sea otters currently have stable populations in parts of the Russian east coast , Alaska , British Columbia , Washington , and California , with reports of recolonizations in Mexico and Japan . Population estimates made between 2004 and 2007 give a worldwide total of approximately 107 @,@ 000 sea otters .

= = = Russia = = =

Currently , the most stable and secure part of the sea otter 's range is Russia . Before the 19th century , around 20 @,@ 000 to 25 @,@ 000 sea otters lived near the Kuril Islands , with more near Kamchatka and the Commander Islands . After the years of the Great Hunt , the population in these areas , currently part of Russia , was only 750 . By 2004 , sea otters had repopulated all of their former habitat in these areas , with an estimated total population of about 27 @,@ 000 . Of these , about 19 @,@ 000 are at the Kurils , 2 @,@ 000 to 3 @,@ 500 at Kamchatka and another 5 @,@ 000 to 5 @,@ 500 at the Commander Islands . Growth has slowed slightly , suggesting the numbers are reaching carrying capacity .

= = = Alaska = = =

Alaska is the heartland of the sea otter 's range . In 1973 , the population in Alaska was estimated at between 100 @,@ 000 and 125 @,@ 000 animals . By 2006 , though , the Alaska population had fallen to an estimated 73 @,@ 000 animals . A massive decline in sea otter populations in the

Aleutian Islands accounts for most of the change ; the cause of this decline is not known , although orca predation is suspected . The sea otter population in Prince William Sound was also hit hard by the Exxon Valdez oil spill , which killed thousands of sea otters in 1989 .

= = = British Columbia = = =

Along the North American coast south of Alaska , the sea otter 's range is discontinuous . A remnant population survived off Vancouver Island into the 20th century , but it died out despite the 1911 international protection treaty , with the last sea otter taken near Kyuquot in 1929 . From 1969 to 1972 , 89 sea otters were flown or shipped from Alaska to the west coast of Vancouver Island .

This population expanded to over 3 @, @ 200 in 2004 , and their range on the island 's west coast expanded from Cape Scott in the north to Barkley Sound to the south . In 1989 , a separate colony was discovered in the central British Columbia coast . It is not known if this colony , which numbered about 300 animals in 2004 , was founded by transplanted otters or by survivors of the fur trade .

The status of the sea otters has improved since 2004 with a report of 4 @, @ 700 in 2008 that improved their status to " special concern " in Canada . They currently occupy much of the exposed west coast of Vancouver Island and parts of the central mainland BC coast .

= = = Washington = = =

In 1969 and 1970 , 59 sea otters were translocated from Amchitka Island to Washington . Annual surveys between 2000 and 2004 have recorded between 504 and 743 individuals , and their range is in the Olympic Peninsula from just south of Destruction Island to Pillar Point . In Washington , sea otters are found almost exclusively on the outer coasts . They can swim as close as six feet off shore along the Olympic coast . Reported sightings of sea otters in the San Juan Islands and Puget Sound almost always turn out to be North American river otters , which are commonly seen along the seashore . However , biologists have confirmed isolated sightings of sea otters in these areas since the mid @-@ 1990s .

= = = California = = =

The historic population of California sea otters was estimated at 16 @, @ 000 before the fur trade began . California 's sea otters are the descendants of a single colony of about 50 southern sea otters discovered near Bixby Bridge in Big Sur in 1938 . Their principal range has gradually expanded and extends from Pigeon Point in San Mateo County to Santa Barbara County .

For southern sea otters to be considered for removal from threatened species listing , the population would have to exceed 3 @, @ 090 for three consecutive years . The most recent (spring 2014) United States Geological Survey (USGS) California sea otter survey count is 2 @, @ 944 , almost flat for the last five years . There has been some contraction from the northern (now Pigeon Point) and southern limits of the sea otter 's range apparently related to lethal shark bites . The 2013 USGS survey found 2 @, @ 941 California sea otters , a slight increase from 2012 but a portion of the increase is artificial because the count included , for the first time , the SNI population which had recovered to 59 individuals . The California sea otter census in 2012 was 2 @, @ 792 , down from the peak spring 2007 census of 3 @, @ 026 sea otters , but up from the recent low of 2 @, @ 711 in 2010 .

In the late 1980s , the U.S. Fish and Wildlife Service (USFWS) relocated about 140 Californian sea otters to San Nicolas Island (SNI) in southern California , in the hope of establishing a reserve population should the mainland be struck by an oil spill . To the surprise of biologists , the San Nicolas sea otters mostly swam back to the mainland . By 2005 , only 30 sea otters remained at San Nicolas , although they were slowly increasing as they thrived on the abundant prey around the island . The plan that authorized the translocation program had predicted the carrying capacity would be reached within five to 10 years . The spring 2014 SNI count was 68 sea otters , continuing a 5 @-@ year positive trend of over 16 % per year .

When the FWS implemented the translocation program , it also attempted to implement " zonal management " of the Californian population . To manage the competition between sea otters and fisheries , it declared an " otter @-@ free zone " stretching from Point Conception to the Mexican border . In this zone , only San Nicolas Island was designated as sea otter habitat , and sea otters found elsewhere in the area were supposed to be captured and relocated . These plans were abandoned after many translocated otters died and also as it proved impractical to capture the hundreds of otters which ignored regulations and swam into the zone . However , after engaging in a period of public commentary in 2005 , the Fish and Wildlife Service failed to release a formal decision on the issue . Then , in response to lawsuits filed by the Santa Barbara @-@ based Environmental Defense Center and the Otter Project , on December 19 , 2012 the USFWS declared that the " no otter zone " experiment was a failure , and will protect the otters re @-@ colonizing the coast south of Point Conception as threatened species .

Sea otters were once numerous in San Francisco Bay . Historical records revealed the Russian @-@ American Company sneaked Aleuts into San Francisco Bay multiple times , despite the Spanish capturing or shooting them while hunting sea otters in the estuaries of San Jose , San Mateo , San Bruno and around Angel Island . The founder of Fort Ross , Ivan Kuskov , finding otters scarce on his second voyage to Bodega Bay in 1812 , sent a party of Aleuts to San Francisco Bay , where they met another Russian party and an American party , and caught 1 @,@ 160 sea otters in three months . By 1817 , sea otters in the area were practically eliminated and the Russians sought permission from the Spanish and the Mexican governments to hunt further and further south of San Francisco . Remnant sea otter populations may have survived in the bay until 1840 , when the Rancho Punta de Quentin was granted to Captain John B. R. Cooper , a sea captain from Boston , by Mexican Governor Juan Bautista Alvarado along with a license to hunt sea otters , reportedly then prevalent at the mouth of Corte Madera Creek .

Although the southern sea otter 's range has continuously expanded from the remnant population of about 50 individuals in Big Sur since protection in 1911 , however from 2007 to 2010 , the otter population and its range contracted and since 2010 has made little progress . As of spring 2010 , the northern boundary had moved from about Tunitas Creek to a point 2 km southeast of Pigeon Point , and the southern boundary has moved from approximately Coal Oil Point to Gaviota State Park . Recently , a toxin called microcystin , produced by a type of cyanobacteria (Microcystis) , seems to be concentrated in the shellfish the otters eat , poisoning them . Cyanobacteria are found in stagnant freshwater enriched with nitrogen and phosphorus from septic tank and agricultural fertilizer runoff , and may be flushed into the ocean when streamflows are high in the rainy season . A record number of sea otter carcasses were found on California 's coastline in 2010 , with increased shark attacks an increasing component of the mortality . Great white sharks (Carcharodon carcharias) do not consume relatively fat @-@ poor sea otters but shark @-@ bitten carcasses have increased from 8 % in the 1980s to 15 % in the 1990s and to 30 % in 2010 and 2011 .

Otters were observed twice in Southern California in 2011 , once near Laguna Beach and once at Zuniga Point Jetty , near San Diego . These are the first documented sightings of otters this far south in 30 years .

= = = Oregon = = =

The last native sea otter in Oregon was probably shot and killed in 1906 . In 1970 and 1971 , a total of 95 sea otters were transplanted from Amchitka Island , Alaska to the Southern Oregon coast . However , this translocation effort failed and otters soon again disappeared from the state .

In 2004 , a lone male sea otter took up residence at Simpson Reef off of Cape Arago for six months . This male is thought to have originated from a colony in Washington , but disappeared after a coastal storm .

The most recent sighting of a sea otter off the Oregon coast took place on 18 February 2009 , in Depoe Bay , Oregon . The lone male sea otter could have traveled from either California or Washington .

= = Ecology = =

= = = Diet = = =

Sea otters consume over 100 different prey species . In most of its range , the sea otter 's diet consists almost exclusively of marine benthic invertebrates , including sea urchins , fat innkeeper worms , a variety of bivalves such as clams and mussels , abalone , other mollusks , crustaceans , and snails . Its prey ranges in size from tiny limpets and crabs to giant octopuses . Where prey such as sea urchins , clams , and abalone are present in a range of sizes , sea otters tend to select larger items over smaller ones of similar type . In California , they have been noted to ignore Pismo clams smaller than 3 inches (7 cm) across .

In a few northern areas , fish are also eaten . In studies performed at Amchitka Island in the 1960s , where the sea otter population was at carrying capacity , 50 % of food found in sea otter stomachs was fish . The fish species were usually bottom @-@ dwelling and sedentary or sluggish forms , such as *Hemilepidotus hemilepidotus* and family Tetraodontidae . However , south of Alaska on the North American coast , fish are a negligible or extremely minor part of the sea otter 's diet . Contrary to popular depictions , sea otters rarely eat starfish , and any kelp that is consumed apparently passes through the sea otter 's system undigested .

The individuals within a particular area often differ in their foraging methods and prey types , and tend to follow the same patterns as their mothers . The diet of local populations also changes over time , as sea otters can significantly deplete populations of highly preferred prey such as large sea urchins , and prey availability is also affected by other factors such as fishing by humans . Sea otters can thoroughly remove abalone from an area except for specimens in deep rock crevices , however , they never completely wipe out a prey species from an area . A 2007 Californian study demonstrated , in areas where food was relatively scarce , a wider variety of prey was consumed . Surprisingly , though , the diets of individuals were more specialized in these areas than in areas where food was plentiful .

= = = As a keystone species = = =

Sea otters are a classic example of a keystone species ; their presence affects the ecosystem more profoundly than their size and numbers would suggest . They keep the population of certain benthic (sea floor) herbivores , particularly sea urchins , in check . Sea urchins graze on the lower stems of kelp , causing the kelp to drift away and die . Loss of the habitat and nutrients provided by kelp forests leads to profound cascade effects on the marine ecosystem . North Pacific areas that do not have sea otters often turn into urchin barrens , with abundant sea urchins and no kelp forest .

Reintroduction of sea otters to British Columbia has led to a dramatic improvement in the health of coastal ecosystems , and similar changes have been observed as sea otter populations recovered in the Aleutian and Commander Islands and the Big Sur coast of California . However , some kelp forest ecosystems in California have also thrived without sea otters , with sea urchin populations apparently controlled by other factors . The role of sea otters in maintaining kelp forests has been observed to be more important in areas of open coast than in more protected bays and estuaries .

In addition to promoting growth of kelp forests , sea otters can also have a profound effect in rocky areas that tend to be dominated by mussel beds . They remove mussels from rocks , liberating space for competitive species and thereby increasing the diversity of species in the area .

= = = Predators = = =

Predation of sea otters does occur , although it is not common . Many predators find the otter , with their pungent scent glands , distasteful . Young predators may kill an otter and not eat it . Leading mammalian predators of this species include orcas and sea lions ; bald eagles also prey on pups by

snatching them from the water surface . On land , young sea otters may face attack from bears and coyotes . In California , bites from sharks , particularly great white sharks , have been estimated to cause 10 % of sea otter deaths and are one of the reasons the population has not expanded further north . The great white shark is believed to be their primary predator , and dead sea otters have been found with injuries from shark bites , although there is no evidence that sharks actually eat them . An exhibit at the San Diego Natural History Museum states that cat feces from urban runoff carry *Toxoplasma gondii* parasites to the ocean and kill sea otters .

= = Relationship with humans = =

= = = Fur trade = = =

Sea otters have the thickest fur of any mammal . Their beautiful fur is a main target for many hunters . Archaeological evidence indicates that for thousands of years , indigenous peoples have hunted sea otters for food and fur . Large @-@ scale hunting , part of the Maritime Fur Trade , which would eventually kill approximately one million sea otters , began in the 18th century when hunters and traders began to arrive from all over the world to meet foreign demand for otter pelts , which were one of the world 's most valuable types of fur .

In the early 18th century , Russians began to hunt sea otters in the Kuril Islands and sold them to the Chinese at Kyakhta . Russia was also exploring the far northern Pacific at this time , and sent Vitus Bering to map the Arctic coast and find routes from Siberia to North America . In 1741 , on his second North Pacific voyage , Bering was shipwrecked off Bering Island in the Commander Islands , where he and many of his crew died . The surviving crew members , which included naturalist Georg Steller , discovered sea otters on the beaches of the island and spent the winter hunting sea otters and gambling with otter pelts . They returned to Siberia , having killed nearly 1 @,@ 000 sea otters , and were able to command high prices for the pelts . Thus began what is sometimes called the " Great Hunt " , which would continue for another hundred years . The Russians found the sea otter far more valuable than the sable skins that had driven and paid for most of their expansion across Siberia . If the sea otter pelts brought back by Bering 's survivors had been sold at Kyakhta prices they would have paid for one tenth the cost of Bering 's expedition . In 1775 at Okhotsk , sea otter pelts were worth 50 ? 80 rubles as opposed to 2 @.@ 5 rubles for sable .

Russian fur @-@ hunting expeditions soon depleted the sea otter populations in the Commander Islands , and by 1745 , they began to move on to the Aleutian Islands . The Russians initially traded with the Aleuts inhabitants of these islands for otter pelts , but later enslaved the Aleuts , taking women and children hostage and torturing and killing Aleut men to force them to hunt . Many Aleuts were either murdered by the Russians or died from diseases the hunters had introduced . The Aleut population was reduced , by the Russians ' own estimate , from 20 @,@ 000 to 2 @,@ 000 . By the 1760s , the Russians had reached Alaska . In 1799 , Emperor Paul I consolidated the rival fur @-@ hunting companies into the Russian @-@ American Company , granting it an imperial charter and protection , and a monopoly over trade rights and territorial acquisition . Under Aleksandr I , the administration of the merchant @-@ controlled company was transferred to the Imperial Navy , largely due to the alarming reports by naval officers of native abuse ; in 1818 , the indigenous peoples of Alaska were granted civil rights equivalent to a townsman status in the Russian Empire .

Other nations joined in the hunt in the south . Along the coasts of what is now Mexico and California , Spanish explorers bought sea otter pelts from Native Americans and sold them in Asia . In 1778 , British explorer Captain James Cook reached Vancouver Island and bought sea otter furs from the First Nations people . When Cook 's ship later stopped at a Chinese port , the pelts rapidly sold at high prices , and were soon known as " soft gold " . As word spread , people from all over Europe and North America began to arrive in the Pacific Northwest to trade for sea otter furs .

Russian hunting expanded to the south , initiated by American ship captains , who subcontracted Russian supervisors and Aleut hunters in what are now Washington , Oregon , and California . Between 1803 and 1846 , 72 American ships were involved in the otter hunt in California ,

harvesting an estimated 40 000 skins and tails , compared to only 13 ships of the Russian American Company , which reported 5 696 otter skins taken between 1806 and 1846 . In 1812 , the Russians founded an agricultural settlement at what is now Fort Ross in northern California , as their southern headquarters . Eventually , sea otter populations became so depleted , commercial hunting was no longer viable . It had stopped the Aleutian Islands , by 1808 , as a conservation measure imposed by the Russian American Company . Further restrictions were ordered by the Company in 1834 . When Russia sold Alaska to the United States in 1867 , the Alaska population had recovered to over 100 000 , but Americans resumed hunting and quickly extirpated the sea otter again . Prices rose as the species became rare . During the 1880s , a pelt brought \$ 105 to \$ 165 in the London market , but by 1903 , a pelt could be worth as much as \$ 1 125 . In 1911 , Russia , Japan , Great Britain (for Canada) and the United States signed the Treaty for the Preservation and Protection of Fur Seals , imposing a moratorium on the harvesting of sea otters . So few remained , perhaps only 1 000 ? 2 000 individuals in the wild , that many believed the species would become extinct .

= = = Recovery and conservation = = =

During the 20th century , sea otter numbers rebounded in about two thirds of their historic range , a recovery that is considered one of the greatest successes in marine conservation . However , the IUCN still lists the sea otter as an endangered species , and describes the significant threats to sea otters as oil pollution , predation by orcas , poaching , and conflicts with fisheries ? sea otters can drown if entangled in fishing gear . The hunting of sea otters is no longer legal except for limited harvests by indigenous peoples in the United States . Poaching was a serious concern in the Russian Far East immediately after the collapse of the Soviet Union in 1991 ; however , it has declined significantly with stricter law enforcement and better economic conditions .

The most significant threat to sea otters is oil spills . They are particularly vulnerable , as they rely on their fur to keep warm . When their fur is soaked with oil , it loses its ability to retain air , and the animals can quickly die from hypothermia . The liver , kidneys , and lungs of sea otters also become damaged after they inhale oil or ingest it when grooming . The Exxon Valdez oil spill of 24 March 1989 killed thousands of sea otters in Prince William Sound , and as of 2006 , the lingering oil in the area continues to affect the population . Describing the public sympathy for sea otters that developed from media coverage of the event , a U.S. Fish and Wildlife Service spokesperson wrote :

As a playful , photogenic , innocent bystander , the sea otter epitomized the role of victim ... cute and frolicsome sea otters suddenly in distress , oiled , frightened , and dying , in a losing battle with the oil .

The small geographic ranges of the sea otter populations in California , Washington , and British Columbia mean a single major spill could be catastrophic for that state or province . Prevention of oil spills and preparation for the rescue of otters in the event of one are major areas of focus for conservation efforts . Increasing the size and range of sea otter populations would also reduce the risk of an oil spill wiping out a population . However , because of the species ' reputation for depleting shellfish resources , advocates for commercial , recreational , and subsistence shellfish harvesting have often opposed allowing the sea otter 's range to increase , and there have even been instances of fishermen and others illegally killing them .

In the Aleutian Islands , a massive and unexpected disappearance of sea otters has occurred in recent decades . In the 1980s , the area was home to an estimated 55 000 to 100 000 sea otters , but the population fell to around 6 000 animals by 2000 . The most widely accepted , but still controversial , hypothesis is that killer whales have been eating the otters . The pattern of disappearances is consistent with a rise in predation , but there has been no direct evidence of orcas preying on sea otters to any significant extent .

Another area of concern is California , where recovery began to fluctuate or decline in the late 1990s . Unusually high mortality rates amongst adult and subadult otters , particularly females , have been reported . Necropsies of dead sea otters indicate diseases , particularly *Toxoplasma*

gondii and acanthocephalan parasite infections , are major causes of sea otter mortality in California . The *Toxoplasma gondii* parasite , which is often fatal to sea otters , is carried by wild and domestic cats and may be transmitted by domestic cat droppings flushed into the ocean via sewage systems . Although disease has clearly contributed to the deaths of many of California 's sea otters , it is not known why the California population is apparently more affected by disease than populations in other areas .

Sea otter habitat is preserved through several protected areas in the United States , Russia and Canada . In marine protected areas , polluting activities such as dumping of waste and oil drilling are typically prohibited . An estimated 1 @, @ 200 sea otters live within the Monterey Bay National Marine Sanctuary , and more than 500 live within the Olympic Coast National Marine Sanctuary .

== Economic impact ==

Some of the sea otter 's preferred prey species , particularly abalone , clams , and crabs , are also food sources for humans . In some areas , massive declines in shellfish harvests have been blamed on the sea otter , and intense public debate has taken place over how to manage the competition between sea otters and humans for seafood .

The debate is complicated because sea otters have sometimes been held responsible for declines of shellfish stocks that were more likely caused by overfishing , disease , pollution , and seismic activity . Shellfish declines have also occurred in many parts of the North American Pacific coast that do not have sea otters , and conservationists sometimes note the existence of large concentrations of shellfish on the coast is a recent development resulting from the fur trade 's near @-@ extirpation of the sea otter . Although many factors affect shellfish stocks , sea otter predation can deplete a fishery to the point where it is no longer commercially viable . Scientists agree that sea otters and abalone fisheries cannot exist in the same area , and the same is likely true for certain other types of shellfish , as well .

Many facets of the interaction between sea otters and the human economy are not as immediately felt . Sea otters have been credited with contributing to the kelp harvesting industry via their well @-@ known role in controlling sea urchin populations ; kelp is used in the production of diverse food and pharmaceutical products . Although human divers harvest red sea urchins both for food and to protect the kelp , sea otters hunt more sea urchin species and are more consistently effective in controlling these populations . The health of the kelp forest ecosystem is significant in nurturing populations of fish , including commercially important fish species . In some areas , sea otters are popular tourist attractions , bringing visitors to local hotels , restaurants , and sea otter @-@ watching expeditions .

== Role in human cultures ==

For many maritime indigenous cultures throughout the North Pacific , especially the Ainu in the Kuril Islands , the Koryaks and Itelmen of Kamchatka , the Aleut in the Aleutian Islands , the Haida of Haida Gwaii and a host of tribes on the Pacific coast of North America , the sea otter has played an important role as a cultural , as well as material , resource . In these cultures , many of which have strongly animist traditions full of legends and stories in which many aspects of the natural world are associated with spirits , the sea otter was considered particularly kin to humans . The Nuu @-@ chah @-@ nulth , Haida , and other First Nations of coastal British Columbia used the warm and luxurious pelts as chiefs ' regalia . Sea otter pelts were given in potlatches to mark coming @-@ of @-@ age ceremonies , weddings , and funerals . The Aleuts carved sea otter bones for use as ornaments and in games , and used powdered sea otter baculum as a medicine for fever .

Among the Ainu , the otter is portrayed as an occasional messenger between humans and the creator . The sea otter is a recurring figure in Ainu folklore . A major Ainu epic , the Kutune Shirka , tells the tale of wars and struggles over a golden sea otter . Versions of a widespread Aleut legend tell of lovers or despairing women who plunge into the sea and become otters . These links have been associated with the many human @-@ like behavioral features of the sea otter , including

apparent playfulness , strong mother @-@ pup bonds and tool use , yielding to ready anthropomorphism . The beginning of commercial exploitation had a great impact on the human , as well as animal , populations the Ainu and Aleuts have been displaced or their numbers are dwindling , while the coastal tribes of North America , where the otter is in any case greatly depleted , no longer rely as intimately on sea mammals for survival .

Since the mid @-@ 1970s , the beauty and charisma of the species have gained wide appreciation , and the sea otter has become an icon of environmental conservation . The round , expressive face and soft , furry body of the sea otter are depicted in a wide variety of souvenirs , postcards , clothing , and stuffed toys .

= = = H1N1 host = = =

According to the U.S. Geological Survey and the CDC , northern sea otters , off the coast of Washington state , are infected with the H1N1 flu virus and " may be a newly identified animal host of influenza viruses " .

= = = Aquariums and zoos = = =

Sea otters can do well in captivity , and are featured in over 40 public aquariums and zoos . The Seattle Aquarium became the first institution to raise sea otters from conception to adulthood with the birth of Tichuk in 1979 , followed by three more pups in the early 1980s . In 2007 , a YouTube video of two sea otters holding paws drew 1 @.@ 5 million viewers in two weeks , and had over 20 million views as of January 2015 . Filmed five years previously at the Vancouver Aquarium , it was YouTube 's most popular animal video at the time , although it has since been surpassed . The lighter @-@ colored otter in the video is Nyac , a survivor of the 1989 Exxon Valdez oil spill . Nyac died in September 2008 , at the age of 20 . Milo , the darker one , died of lymphoma in January , 2012